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(54) Title: GTP-BINDING ASSOCIATED PROTEINS

(57) Abstract: The invention provides human GTP-binding associated proteins (GBAP) and polynucleotides which identify and encode GBAP. The invention also provides expression vectors, host cells, antibodies, agonists, and antagonists. The invention also provides methods for diagnosing, treating, or preventing disorders associated with expression of GBAP.

GTP-BINDING ASSOCIATED PROTEINS

TECHNICAL FIELD

5 This invention relates to nucleic acid and amino acid sequences of GTP-binding associated proteins and to the use of these sequences in the diagnosis, treatment, and prevention of immune system, reproductive, nervous system, and cell signaling disorders, and cell proliferative disorders including cancer.

10 BACKGROUND OF THE INVENTION

Guanine nucleotide binding proteins (GTP-binding proteins) are present in all eukaryotic cells and function in processes including metabolism, cellular growth, differentiation, signal transduction, cytoskeletal organization, and intracellular vesicle transport and secretion. In higher organisms they are involved in signaling that regulates such processes as the immune response (Aussel, C. et al. (1988) J. Immunol. 140:215-220), apoptosis, differentiation, and cell proliferation including oncogenesis (Dhanasekaran, N. et al. (1998) Oncogene 17:1383-1394).

The superfamily of GTP-binding proteins can be subdivided into groups such as translational factors, heterotrimeric GTP-binding proteins involved in transmembrane signaling processes (also called G-proteins), proto-oncogene Ras proteins, other low molecular weight GTP-binding proteins including the products of rab, rap, rho, rac, smg21, smg25, YPT, SEC4, and ARF genes, and tubulins (Kaziro, Y. et al. (1991) Annu. Rev. Biochem. 60:349-400).

GTP-binding proteins are involved in protein biosynthesis and include initiation factor 2 (IF-2), elongation factor 2 (EF-Tu), and elongation factor G (EF-G), observed in prokaryotes; and initiation factor 2 (eIF-2), elongation factor 1 α (EF-1 α), elongation factor 2 (EF-2), and release factor 3 (eRF3) observed in eukaryotes (Kaziro, *supra*). IF-2 promotes the GTP-dependent binding of the tRNA to the small subunit of the ribosome, the step that initiates protein translation. Elongation factors promote the binding of tRNA and GTP and the displacement of GDP after hydrolysis as protein biosynthesis proceeds. eRF3 participates in the recognition of stop codons and the release of nascent proteins from ribosomes.

30 Heterotrimeric GTP-binding proteins are composed of 3 subunits (α , β and γ) which, in the resting state, associate as a trimer at the inner face of the plasma membrane. Heterotrimeric G-proteins may be classified based on the sequence similarity of α subunits into the Gs, Gi, Gq and G12 subgroups. In the resting state, the α subunit binds guanosine diphosphate (GDP), and stimulation of the G-protein by an activated receptor leads to exchange of GDP for guanosine triphosphate (GTP).
35 This exchange results in the separation of the α from the β and γ subunits, which remain tightly

associated as a dimer. Both the α subunit and β - γ dimer are then able to interact with effectors, either individually or in a cooperative manner. The intrinsic GTPase activity of the α subunit hydrolyzes the bound GTP to GDP. This returns the α subunit to its inactive conformation and allows it to reassociate with the β - γ complex, thus restoring the system to its resting state (Kaziro, supra). Some α subunits show tissue-specific expression indicating a specialized signaling role (Dhanasekaran, supra).

The α -s class of G-protein subunits is sensitive to ADP-ribosylation by pertussis toxin which uncouples the receptor:G-protein interaction. This uncoupling blocks signal transduction to receptors that decrease cAMP levels. cAMP levels regulate ion channels and activate phospholipases. The inhibitory α -I class is also susceptible to modification by pertussis toxin, which prevents α -I from lowering cAMP levels. Two novel classes of α subunits refractory to pertussis toxin modification are α -q, which activates phospholipase C, and α -12, which has sequence homology with the Drosophila gene concertina and may contribute to the regulation of embryonic development (Simon, M.I. (1991) Science 252:802-808).

The mammalian G-protein β and γ subunits, each about 340 amino acids long, share more than 80% homology. The β subunit (also called β -transducin) contains seven repeating units, each about 43 amino acids long. This WD-repeat, or G-beta repeat motif, is found in a variety of proteins with regulatory function such as Sec13, a yeast WD repeat protein involved in vesicular traffic; coronin-2, a mammalian WD repeat protein involved in regulation of the actin cytoskeleton; and Bop1, a mammalian WD repeat protein involved in growth suppression (Garcia-Higuera, I. et al. (1998) J. Biol. Chem. 273:9041-9049; Okumura, M. et al. (1998) DNA Cell Biol. 17:779-787; Pestov, D.G. et al. (1998) Oncogene 17:3187-3197). The activity of the β and γ subunits may be regulated by other proteins such as calmodulin, phosducin, or the neural protein GAP 43 (Clapham, D.E. and E.J. Neer (1993) Nature 365:403-406). The β subunit sequences are highly conserved among species, suggesting that they perform a fundamentally important role in the organization and function of G-protein linked systems (Van der Voorn, L. and H.L. Ploegh (1992) FEBS Lett. 307:131-134).

Mutations and variant expression of β -transducin proteins are linked with various disorders. Mutations in LIS1, a subunit of the human platelet activating factor acetylhydrolase, cause Miller-Dieker lissencephaly. RACK1 binds activated protein kinase C, and RbAp48 binds retinoblastoma protein. CstF is required for polyadenylation of mammalian pre-mRNA in vitro and associates with subunits of cleavage-stimulating factor. Defects in the regulation of β -catenin contribute to the neoplastic transformation of human cells. The WD40 repeats of the human F-box protein β TrCP mediate binding to β -catenin, thus regulating the targeted degradation of β -catenin by ubiquitin ligase (Neer, E.J. et al. (1994) Nature 371:297-300; Hart, M. et al. (1999) Curr. Biol. 9:207-210).

The γ subunit sequences are more variable than those of the β subunits. They are often post-translationally modified by isoprenylation and carboxyl-methylation of a cysteine residue four amino

acids from the C-terminus. These modifications appear to be necessary for the interaction of the β - γ dimer with the membrane and with other GTP-binding proteins. The β - γ dimer has been shown to modulate the activity of adenylyl cyclase isoforms, phospholipase C, and some ion channels. It is involved in receptor phosphorylation via specific kinases and has been implicated in the p21ras-
5 dependent activation of the MAP kinase cascade and the recognition of specific receptors by GTP-binding proteins (Clapham and Neer, supra).

G-proteins interact with a variety of effectors including adenylyl cyclase (Clapham and Neer, supra). The signaling pathway mediated by cAMP is mitogenic in hormone-dependent endocrine tissues such as adrenal cortex, thyroid, ovary, pituitary, and testes. Cancers in these tissues have been related
10 to a mutationally activated form of a $G\alpha_s$ known as the gsp (Gs protein) oncogene (Dhanasekaran, supra). Another effector is phosducin, a retinal phosphoprotein, which forms a specific complex with retinal G-protein β and γ subunits and modulates the ability of the β - γ dimer to interact with retinal α subunits (Clapham and Neer, supra). Additional G-protein effectors include RIN1 (Ras interaction/interference), which acts as an effector of H-Ras and interferes with the Ras signal
15 transduction pathway; Rabin3, which associates with the Ras-like GTPase Rab3A; and Rhotekin, a protein that binds with, and inhibits, Rho GTPase activity (Han, L. and J. Colicelli (1995) Mol. Cell Biol. 15:1318-1323; Brondyk, W.H. et al. (1995) Mol. Cell Biol. 15:1137-1143; and Reid, T. et al. (1996) J. Biol. Chem. 27:13556-13560).

The low molecular weight GTP-binding proteins regulate cell growth, cell cycle control, protein
20 secretion, and intracellular vesicle interaction. These GTP-binding proteins respond to extracellular signals from receptors and activating proteins by transducing mitogenic signals (Tavittian, A. (1995) C. R. Seances Soc. Biol. Fil. 189:7-12). Low molecular weight GTP-binding proteins consist of single polypeptides of 21-30kD which, like the α subunit of heterotrimeric GTP-binding proteins, are able to bind to and hydrolyze GTP, thus cycling from an inactive to an active state. The intrinsic rate of GTP
25 hydrolysis of these GTP-binding proteins is typically very slow, but it can be stimulated by several orders of magnitude by GTPase-activating proteins (GAPs), such as β 2-chimaerin (Geyer, M. and Wittinghofer, A. (1997) Curr. Opin. Struct. Biol. 7:786-792; Caloca, M. J. et al. (1997) J. Biol. Chem. 272:26488-26496).

Low molecular weight GTP-binding proteins play critical roles in cellular protein trafficking
30 events, such as the translocation of proteins and soluble complexes from the cytosol to the membrane through an exchange of GDP for GTP (Ktistakis, N.T. (1998) BioEssays 20:495-504). In vesicle transport, the interaction between vesicle- and target- specific identifiers (v-SNAREs and tSNAREs) docks the vesicle to the acceptor membrane. The budding process is regulated by GTPases such as the closely related ADP ribosylation factors (ARFs) and SAR proteins, while GTPases such as Rab allow
35 assembly of SNARE complexes and may play a role in removal of defective complexes (Rothman, J.E.

and F.T. Wieland (1996) *Science* 272:227-234). The rab proteins control the translocation of vesicles to and from membranes for protein localization, protein processing, and secretion. The rho GTP-binding proteins control signal transduction pathways that link growth factor receptors to actin polymerization which is necessary for normal cellular growth and division. The ran GTP-binding proteins are located in the nucleus of cells and have a key role in nuclear protein import, the control of DNA synthesis, and cell-cycle progression (Hall, A. (1990) *Science* 249:635-640; Scheffzek, K. et al. (1995) *Nature* 374:378-381).

The Ras proteins Ras1, Ras2 and G_{α} stimulate adenylyl cyclase (Kaziro, *supra*) which affects a broad array of cellular processes including determination of whether cells continue to grow or become terminally differentiated. Stimulation of cell surface receptors activates Ras which, in turn, activates cytoplasmic kinases. These kinases translocate to the nucleus and activate key transcription factors that control gene expression and protein synthesis (Barbacid, M. (1987) *Annu. Rev. Biochem.* 56:779-827; Treisman, R. (1994) *Curr. Opin. Genet. Dev.* 4:96-101). Mutant Ras-family proteins which bind but cannot hydrolyze GTP are permanently activated and are thus rendered oncogenic (Drivas, G.T. et al. (1990) *Mol. Cell. Biol.* 10:1793-1798).

Ras-like proteins have also been implicated in tumor suppression. For example, NOEY2, a novel gene encoding a Ras-like protein, is expressed in normal ovarian and breast epithelial cells. However, NOEY2 expression is reduced or abrogated in ovarian and breast carcinomas, suggesting a role for the NOEY2 gene product in tumor suppression (Yu, Y. et al. (1999) *Proc. Natl. Acad. Sci. USA* 96:214-219).

Irregularities in GTP-binding protein signaling cascades may result in abnormal activation of leukocytes and lymphocytes, leading to the tissue damage and destruction seen in many inflammatory and autoimmune diseases such as rheumatoid arthritis, biliary cirrhosis, hemolytic anemia, lupus erythematosus, and thyroiditis. Abnormal cell proliferation, including cyclic AMP-mediated stimulation of brain, thyroid, adrenal, and gonadal tissue proliferation is regulated by G proteins. Mutations in G_{α} subunits have been found in growth-hormone-secreting pituitary somatotroph tumors, hyperfunctioning thyroid adenomas, and ovarian and adrenal neoplasms (Meij, J.T.A. (1996) *Mol. Cell. Biochem.* 157:31-38; Aussel, *supra*).

The discovery of new GTP-binding associated proteins and the polynucleotides encoding them satisfies a need in the art by providing new compositions which are useful in the diagnosis, prevention, and treatment of immune system, reproductive, nervous system, and cell signaling disorders, and cell proliferative disorders including cancer.

SUMMARY OF THE INVENTION

The invention features purified polypeptides, GTP-binding associated proteins, referred to

collectively as "GBAP" and individually as "GBAP-1," "GBAP-2," "GBAP-3," "GBAP-4," "GBAP-5," "GBAP-6," "GBAP-7," "GBAP-8," "GBAP-9," "GBAP-10," "GBAP-11," "GBAP-12," "GBAP-13," "GBAP-14," "GBAP-15," "GBAP-16," "GBAP-17," "GBAP-18," "GBAP-19," "GBAP-20," "GBAP-21," "GBAP-22," "GBAP-23," "GBAP-24," "GBAP-25," "GBAP-26," "GBAP-27,"

5 "GBAP-28," "GBAP-29," "GBAP-30," "GBAP-31," "GBAP-32," "GBAP-33," "GBAP-34," "GBAP-35," "GBAP-36," "GBAP-37," "GBAP-38," "GBAP-39," "GBAP-40," "GBAP-41," "GBAP-42," "GBAP-43," "GBAP-44," "GBAP-45," "GBAP-46," "GBAP-47," "GBAP-48," "GBAP-49," "GBAP-50," "GBAP-51," "GBAP-52," "GBAP-53," "GBAP-54," "GBAP-55," "GBAP-56," "GBAP-57," "GBAP-58," "GBAP-59," "GBAP-60," "GBAP-61," "GBAP-62,"

10 "GBAP-63," "GBAP-64," "GBAP-65," and "GBAP-66." In one aspect, the invention provides an isolated polypeptide comprising an amino acid sequence selected from the group consisting of a) an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, b) a naturally occurring amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, c) a biologically active fragment of an amino acid sequence

15 selected from the group consisting of SEQ ID NO:1-66, and d) an immunogenic fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66. In one alternative, the invention provides an isolated polypeptide comprising the amino acid sequence of SEQ ID NO:1-66.

The invention further provides an isolated polynucleotide encoding a polypeptide comprising an amino acid sequence selected from the group consisting of a) an amino acid sequence selected from the

20 group consisting of SEQ ID NO:1-66, b) a naturally occurring amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, c) a biologically active fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, and d) an immunogenic fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66. In one alternative, the polynucleotide encodes a polypeptide selected

25 from the group consisting of SEQ ID NO:1-66. In another alternative, the polynucleotide is selected from the group consisting of SEQ ID NO:67-132.

Additionally, the invention provides a recombinant polynucleotide comprising a promoter sequence operably linked to a polynucleotide encoding a polypeptide comprising an amino acid sequence selected from the group consisting of a) an amino acid sequence selected from the group

30 consisting of SEQ ID NO:1-66, b) a naturally occurring amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, c) a biologically active fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, and d) an immunogenic fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66. In one alternative, the invention provides a cell transformed with the

35 recombinant polynucleotide. In another alternative, the invention provides a transgenic organism

comprising the recombinant polynucleotide.

The invention also provides a method for producing a polypeptide comprising an amino acid sequence selected from the group consisting of a) an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, b) a naturally occurring amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, c) a biologically active fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, and d) an immunogenic fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66. The method comprises a) culturing a cell under conditions suitable for expression of the polypeptide, wherein said cell is transformed with a recombinant polynucleotide comprising a promoter sequence operably linked to a polynucleotide encoding the polypeptide, and b) recovering the polypeptide so expressed.

Additionally, the invention provides an isolated antibody which specifically binds to a polypeptide comprising an amino acid sequence selected from the group consisting of a) an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, b) a naturally occurring amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, c) a biologically active fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, and d) an immunogenic fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66.

The invention further provides an isolated polynucleotide comprising a polynucleotide sequence selected from the group consisting of a) a polynucleotide sequence selected from the group consisting of SEQ ID NO:67-132, b) a naturally occurring polynucleotide sequence having at least 70% sequence identity to a polynucleotide sequence selected from the group consisting of SEQ ID NO:67-132, c) a polynucleotide sequence complementary to a), d) a polynucleotide sequence complementary to b), and e) an RNA equivalent of a)-d). In one alternative, the polynucleotide comprises at least 60 contiguous nucleotides.

Additionally, the invention provides a method for detecting a target polynucleotide in a sample, said target polynucleotide having a sequence of a polynucleotide comprising a polynucleotide sequence selected from the group consisting of a) a polynucleotide sequence selected from the group consisting of SEQ ID NO:67-132, b) a naturally occurring polynucleotide sequence having at least 70% sequence identity to a polynucleotide sequence selected from the group consisting of SEQ ID NO:67-132, c) a polynucleotide sequence complementary to a), d) a polynucleotide sequence complementary to b), and e) an RNA equivalent of a)-d). The method comprises a) hybridizing the sample with a probe comprising at least 20 contiguous nucleotides comprising a sequence complementary to said target polynucleotide in the sample, and which probe specifically hybridizes to said target polynucleotide, under conditions whereby a hybridization complex is formed between said probe and said target polynucleotide or

fragments thereof, and b) detecting the presence or absence of said hybridization complex, and optionally, if present, the amount thereof. In one alternative, the probe comprises at least 60 contiguous nucleotides.

The invention further provides a method for detecting a target polynucleotide in a sample, said
5 target polynucleotide having a sequence of a polynucleotide comprising a polynucleotide sequence selected from the group consisting of a) a polynucleotide sequence selected from the group consisting of SEQ ID NO:67-132, b) a naturally occurring polynucleotide sequence having at least 70% sequence identity to a polynucleotide sequence selected from the group consisting of SEQ ID NO:67-132, c) a polynucleotide sequence complementary to a), d) a polynucleotide sequence complementary to b), and e)
10 an RNA equivalent of a)-d). The method comprises a) amplifying said target polynucleotide or fragment thereof using polymerase chain reaction amplification, and b) detecting the presence or absence of said amplified target polynucleotide or fragment thereof, and, optionally, if present, the amount thereof.

The invention further provides a composition comprising an effective amount of a polypeptide
15 comprising an amino acid sequence selected from the group consisting of a) an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, b) a naturally occurring amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, c) a biologically active fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, and d) an immunogenic fragment of an amino acid sequence selected
20 from the group consisting of SEQ ID NO:1-66, and a pharmaceutically acceptable excipient. In one embodiment, the composition comprises an amino acid sequence selected from the group consisting of SEQ ID NO:1-66. The invention additionally provides a method of treating a disease or condition associated with decreased expression of functional GBAP, comprising administering to a patient in need of such treatment the composition.

25 The invention also provides a method for screening a compound for effectiveness as an agonist of a polypeptide comprising an amino acid sequence selected from the group consisting of a) an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, b) a naturally occurring amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, c) a biologically active fragment of an amino acid sequence
30 selected from the group consisting of SEQ ID NO:1-66, and d) an immunogenic fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66. The method comprises a) exposing a sample comprising the polypeptide to a compound, and b) detecting agonist activity in the sample. In one alternative, the invention provides a composition comprising an agonist compound identified by the method and a pharmaceutically acceptable excipient. In another alternative, the
35 invention provides a method of treating a disease or condition associated with decreased expression of

functional GBAP, comprising administering to a patient in need of such treatment the composition.

Additionally, the invention provides a method for screening a compound for effectiveness as an antagonist of a polypeptide comprising an amino acid sequence selected from the group consisting of a) an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, b) a naturally occurring amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, c) a biologically active fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, and d) an immunogenic fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66. The method comprises a) exposing a sample comprising the polypeptide to a compound, and b) detecting antagonist activity in the sample. In one alternative, the invention provides a composition comprising an antagonist compound identified by the method and a pharmaceutically acceptable excipient. In another alternative, the invention provides a method of treating a disease or condition associated with overexpression of functional GBAP, comprising administering to a patient in need of such treatment the composition.

The invention further provides a method of screening for a compound that specifically binds to a polypeptide comprising an amino acid sequence selected from the group consisting of a) an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, b) a naturally occurring amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, c) a biologically active fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, and d) an immunogenic fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66. The method comprises a) combining the polypeptide with at least one test compound under suitable conditions, and b) detecting binding of the polypeptide to the test compound, thereby identifying a compound that specifically binds to the polypeptide.

The invention further provides a method of screening for a compound that modulates the activity of a polypeptide comprising an amino acid sequence selected from the group consisting of a) an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, b) a naturally occurring amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, c) a biologically active fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66, and d) an immunogenic fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1-66. The method comprises a) combining the polypeptide with at least one test compound under conditions permissive for the activity of the polypeptide, b) assessing the activity of the polypeptide in the presence of the test compound, and c) comparing the activity of the polypeptide in the presence of the test compound with the activity of the polypeptide in the absence of the test compound, wherein a

change in the activity of the polypeptide in the presence of the test compound is indicative of a compound that modulates the activity of the polypeptide.

The invention further provides a method for screening a compound for effectiveness in altering expression of a target polynucleotide, wherein said target polynucleotide comprises a sequence selected from the group consisting of SEQ ID NO:67-132, the method comprising a) exposing a sample comprising the target polynucleotide to a compound, and b) detecting altered expression of the target polynucleotide.

The invention further provides a method for assessing toxicity of a test compound, said method comprising a) treating a biological sample containing nucleic acids with the test compound; b) hybridizing the nucleic acids of the treated biological sample with a probe comprising at least contiguous nucleotides of a polynucleotide comprising a polynucleotide sequence selected from the group consisting of i) a polynucleotide sequence selected from the group consisting of SEQ ID NO:67-132, ii) a naturally occurring polynucleotide sequence having at least 70% sequence identity to a polynucleotide sequence selected from the group consisting of SEQ ID NO:67-132, iii) a polynucleotide sequence complementary to i), iv) a polynucleotide sequence complementary to ii), and v) an RNA equivalent of i)-iv). Hybridization occurs under conditions whereby a specific hybridization complex is formed between said probe and a target polynucleotide in the biological sample, said target polynucleotide comprising a polynucleotide sequence selected from the group consisting of SEQ ID NO:67-132, ii) a naturally occurring polynucleotide sequence having at least 70% sequence identity to a polynucleotide sequence selected from the group consisting of SEQ ID NO:67-132, iii) a polynucleotide sequence complementary to i), iv) a polynucleotide sequence complementary to ii), and v) an RNA equivalent of i)-iv). Alternatively, the target polynucleotide comprises a fragment of the above polynucleotide sequence; c) quantifying the amount of hybridization complex; and d) comparing the amount of hybridization complex in the treated biological sample with the amount of hybridization complex in an untreated biological sample, wherein a difference in the amount of hybridization complex in the treated biological sample is indicative of toxicity of the test compound.

BRIEF DESCRIPTION OF THE TABLES

Table 1 shows polypeptide and nucleotide sequence identification numbers (SEQ ID NOs), clone identification numbers (clone IDs), cDNA libraries, and cDNA fragments used to assemble full-length sequences encoding GBAP.

Table 2 shows features of each polypeptide sequence, including potential motifs, homologous sequences, and methods, algorithms, and searchable databases used for analysis of GBAP.

Table 3 shows selected fragments of each nucleic acid sequence; the tissue-specific expression

patterns of each nucleic acid sequence as determined by northern analysis; diseases, disorders, or conditions associated with these tissues; and the vector into which each cDNA was cloned.

Table 4 describes the tissues used to construct the cDNA libraries from which cDNA clones encoding GBAP were isolated.

5 Table 5 shows the tools, programs, and algorithms used to analyze the polynucleotides and polypeptides of the invention, along with applicable descriptions, references, and threshold parameters.

DESCRIPTION OF THE INVENTION

Before the present proteins, nucleotide sequences, and methods are described, it is understood
10 that this invention is not limited to the particular machines, materials and methods described, as these may vary. It is also to be understood that the terminology used herein is for the purpose of describing particular embodiments only, and is not intended to limit the scope of the present invention which will be limited only by the appended claims.

It must be noted that as used herein and in the appended claims, the singular forms "a," "an,"
15 and "the" include plural reference unless the context clearly dictates otherwise. Thus, for example, a reference to "a host cell" includes a plurality of such host cells, and a reference to "an antibody" is a reference to one or more antibodies and equivalents thereof known to those skilled in the art, and so forth.

Unless defined otherwise, all technical and scientific terms used herein have the same meanings
20 as commonly understood by one of ordinary skill in the art to which this invention belongs. Although any machines, materials, and methods similar or equivalent to those described herein can be used to practice or test the present invention, the preferred machines, materials and methods are now described. All publications mentioned herein are cited for the purpose of describing and disclosing the cell lines, protocols, reagents and vectors which are reported in the publications and which might be used in
25 connection with the invention. Nothing herein is to be construed as an admission that the invention is not entitled to antedate such disclosure by virtue of prior invention.

DEFINITIONS

"GBAP" refers to the amino acid sequences of substantially purified GBAP obtained from any species, particularly a mammalian species, including bovine, ovine, porcine, murine, equine, and
30 human, and from any source, whether natural, synthetic, semi-synthetic, or recombinant.

The term "agonist" refers to a molecule which intensifies or mimics the biological activity of GBAP. Agonists may include proteins, nucleic acids, carbohydrates, small molecules, or any other compound or composition which modulates the activity of GBAP either by directly interacting with GBAP or by acting on components of the biological pathway in which GBAP participates.

35 An "allelic variant" is an alternative form of the gene encoding GBAP. Allelic variants may

result from at least one mutation in the nucleic acid sequence and may result in altered mRNAs or in polypeptides whose structure or function may or may not be altered. A gene may have none, one, or many allelic variants of its naturally occurring form. Common mutational changes which give rise to allelic variants are generally ascribed to natural deletions, additions, or substitutions of nucleotides.

- 5 Each of these types of changes may occur alone, or in combination with the others, one or more times in a given sequence.

“Altered” nucleic acid sequences encoding GBAP include those sequences with deletions, insertions, or substitutions of different nucleotides, resulting in a polypeptide the same as GBAP or a polypeptide with at least one functional characteristic of GBAP. Included within this definition are

10 polymorphisms which may or may not be readily detectable using a particular oligonucleotide probe of the polynucleotide encoding GBAP, and improper or unexpected hybridization to allelic variants, with a locus other than the normal chromosomal locus for the polynucleotide sequence encoding GBAP. The encoded protein may also be “altered,” and may contain deletions, insertions, or substitutions of amino acid residues which produce a silent change and result in a functionally equivalent GBAP. Deliberate

15 amino acid substitutions may be made on the basis of similarity in polarity, charge, solubility, hydrophobicity, hydrophilicity, and/or the amphipathic nature of the residues, as long as the biological or immunological activity of GBAP is retained. For example, negatively charged amino acids may include aspartic acid and glutamic acid, and positively charged amino acids may include lysine and arginine. Amino acids with uncharged polar side chains having similar hydrophilicity values may

20 include: asparagine and glutamine; and serine and threonine. Amino acids with uncharged side chains having similar hydrophilicity values may include: leucine, isoleucine, and valine; glycine and alanine; and phenylalanine and tyrosine.

The terms “amino acid” and “amino acid sequence” refer to an oligopeptide, peptide, polypeptide, or protein sequence, or a fragment of any of these, and to naturally occurring or synthetic

25 molecules. Where “amino acid sequence” is recited to refer to a sequence of a naturally occurring protein molecule, “amino acid sequence” and like terms are not meant to limit the amino acid sequence to the complete native amino acid sequence associated with the recited protein molecule.

“Amplification” relates to the production of additional copies of a nucleic acid sequence. Amplification is generally carried out using polymerase chain reaction (PCR) technologies well known

30 in the art.

The term “antagonist” refers to a molecule which inhibits or attenuates the biological activity of GBAP. Antagonists may include proteins such as antibodies, nucleic acids, carbohydrates, small molecules, or any other compound or composition which modulates the activity of GBAP either by directly interacting with GBAP or by acting on components of the biological pathway in which GBAP

35 participates.

The term "antibody" refers to intact immunoglobulin molecules as well as to fragments thereof, such as Fab, F(ab')₂, and Fv fragments, which are capable of binding an epitopic determinant. Antibodies that bind GBAP polypeptides can be prepared using intact polypeptides or using fragments containing small peptides of interest as the immunizing antigen. The polypeptide or oligopeptide used to immunize an animal (e.g., a mouse, a rat, or a rabbit) can be derived from the translation of RNA, or synthesized chemically, and can be conjugated to a carrier protein if desired. Commonly used carriers that are chemically coupled to peptides include bovine serum albumin, thyroglobulin, and keyhole limpet hemocyanin (KLH). The coupled peptide is then used to immunize the animal.

The term "antigenic determinant" refers to that region of a molecule (i.e., an epitope) that makes contact with a particular antibody. When a protein or a fragment of a protein is used to immunize a host animal, numerous regions of the protein may induce the production of antibodies which bind specifically to antigenic determinants (particular regions or three-dimensional structures on the protein). An antigenic determinant may compete with the intact antigen (i.e., the immunogen used to elicit the immune response) for binding to an antibody.

The term "antisense" refers to any composition capable of base-pairing with the "sense" (coding) strand of a specific nucleic acid sequence. Antisense compositions may include DNA; RNA; peptide nucleic acid (PNA); oligonucleotides having modified backbone linkages such as phosphorothioates, methylphosphonates, or benzylphosphonates; oligonucleotides having modified sugar groups such as 2'-methoxyethyl sugars or 2'-methoxyethoxy sugars; or oligonucleotides having modified bases such as 5-methyl cytosine, 2'-deoxyuracil, or 7-deaza-2'-deoxyguanosine. Antisense molecules may be produced by any method including chemical synthesis or transcription. Once introduced into a cell, the complementary antisense molecule base-pairs with a naturally occurring nucleic acid sequence produced by the cell to form duplexes which block either transcription or translation. The designation "negative" or "minus" can refer to the antisense strand, and the designation "positive" or "plus" can refer to the sense strand of a reference DNA molecule.

The term "biologically active" refers to a protein having structural, regulatory, or biochemical functions of a naturally occurring molecule. Likewise, "immunologically active" or "immunogenic" refers to the capability of the natural, recombinant, or synthetic GBAP, or of any oligopeptide thereof, to induce a specific immune response in appropriate animals or cells and to bind with specific antibodies.

"Complementary" describes the relationship between two single-stranded nucleic acid sequences that anneal by base-pairing. For example, 5'-AGT-3' pairs with its complement, 3'-TCA-5'.

A "composition comprising a given polynucleotide sequence" and a "composition comprising a given amino acid sequence" refer broadly to any composition containing the given polynucleotide or

amino acid sequence. The composition may comprise a dry formulation or an aqueous solution. Compositions comprising polynucleotide sequences encoding GBAP or fragments of GBAP may be employed as hybridization probes. The probes may be stored in freeze-dried form and may be associated with a stabilizing agent such as a carbohydrate. In hybridizations, the probe may be
 5 deployed in an aqueous solution containing salts (e.g., NaCl), detergents (e.g., sodium dodecyl sulfate; SDS), and other components (e.g., Denhardt's solution, dry milk, salmon sperm DNA, etc.).

"Consensus sequence" refers to a nucleic acid sequence which has been subjected to repeated DNA sequence analysis to resolve uncalled bases, extended using the XL-PCR kit (PE Biosystems, Foster City CA) in the 5' and/or the 3' direction, and resequenced, or which has been assembled from
 10 one or more overlapping cDNA, EST, or genomic DNA fragments using a computer program for fragment assembly, such as the GELVIEW fragment assembly system (GCG, Madison WI) or Phrap (University of Washington, Seattle WA). Some sequences have been both extended and assembled to produce the consensus sequence.

"Conservative amino acid substitutions" are those substitutions that are predicted to least
 15 interfere with the properties of the original protein, i.e., the structure and especially the function of the protein is conserved and not significantly changed by such substitutions. The table below shows amino acids which may be substituted for an original amino acid in a protein and which are regarded as conservative amino acid substitutions.

	Original Residue	Conservative Substitution
20	Ala	Gly, Ser
	Arg	His, Lys
	Asn	Asp, Gln, His
	Asp	Asn, Glu
	Cys	Ala, Ser
25	Gln	Asn, Glu, His
	Glu	Asp, Gln, His
	Gly	Ala
	His	Asn, Arg, Gln, Glu
	Ile	Leu, Val
30	Leu	Ile, Val
	Lys	Arg, Gln, Glu
	Met	Leu, Ile
	Phe	His, Met, Leu, Trp, Tyr
	Ser	Cys, Thr
35	Thr	Ser, Val
	Trp	Phe, Tyr
	Tyr	His, Phe, Trp
	Val	Ile, Leu, Thr

40 Conservative amino acid substitutions generally maintain (a) the structure of the polypeptide backbone in the area of the substitution, for example, as a beta sheet or alpha helical conformation, (b) the charge or hydrophobicity of the molecule at the site of the substitution, and/or (c) the bulk of the

side chain.

. A "deletion" refers to a change in the amino acid or nucleotide sequence that results in the absence of one or more amino acid residues or nucleotides.

The term "derivative" refers to a chemically modified polynucleotide or polypeptide. Chemical
 5 modifications of a polynucleotide sequence can include, for example, replacement of hydrogen by an alkyl, acyl, hydroxyl, or amino group. A derivative polynucleotide encodes a polypeptide which retains at least one biological or immunological function of the natural molecule. A derivative polypeptide is one modified by glycosylation, pegylation, or any similar process that retains at least one biological or immunological function of the polypeptide from which it was derived.

10 A "detectable label" refers to a reporter molecule or enzyme that is capable of generating a measurable signal and is covalently or noncovalently joined to a polynucleotide or polypeptide.

A "fragment" is a unique portion of GBAP or the polynucleotide encoding GBAP which is identical in sequence to but shorter in length than the parent sequence. A fragment may comprise up to the entire length of the defined sequence, minus one nucleotide/amino acid residue. For example, a
 15 fragment may comprise from 5 to 1000 contiguous nucleotides or amino acid residues. A fragment used as a probe, primer, antigen, therapeutic molecule, or for other purposes, may be at least 5, 10, 15, 16, 20, 25, 30, 40, 50, 60, 75, 100, 150, 250 or at least 500 contiguous nucleotides or amino acid residues in length. Fragments may be preferentially selected from certain regions of a molecule. For example, a polypeptide fragment may comprise a certain length of contiguous amino acids selected
 20 from the first 250 or 500 amino acids (or first 25% or 50% of a polypeptide) as shown in a certain defined sequence. Clearly these lengths are exemplary, and any length that is supported by the specification, including the Sequence Listing, tables, and figures, may be encompassed by the present embodiments.

A fragment of SEQ ID NO:67-132 comprises a region of unique polynucleotide sequence that
 25 specifically identifies SEQ ID NO:67-132, for example, as distinct from any other sequence in the genome from which the fragment was obtained. A fragment of SEQ ID NO:67-132 is useful, for example, in hybridization and amplification technologies and in analogous methods that distinguish SEQ ID NO:67-132 from related polynucleotide sequences. The precise length of a fragment of SEQ ID NO:67-132 and the region of SEQ ID NO:67-132 to which the fragment corresponds are routinely
 30 determinable by one of ordinary skill in the art based on the intended purpose for the fragment.

A fragment of SEQ ID NO:1-66 is encoded by a fragment of SEQ ID NO:67-132. A fragment of SEQ ID NO:1-66 comprises a region of unique amino acid sequence that specifically identifies SEQ ID NO:1-66. For example, a fragment of SEQ ID NO:1-66 is useful as an immunogenic peptide for the development of antibodies that specifically recognize SEQ ID NO:1-66.
 35 The precise length of a fragment of SEQ ID NO:1-66 and the region of SEQ ID NO:1-66 to which the

fragment corresponds are routinely determinable by one of ordinary skill in the art based on the intended purpose for the fragment.

A "full-length" polynucleotide sequence is one containing at least a translation initiation codon (e.g., methionine) followed by an open reading frame and a translation termination codon. A "full-length" polynucleotide sequence encodes a "full-length" polypeptide sequence.

"Homology" refers to sequence similarity or, interchangeably, sequence identity, between two or more polynucleotide sequences or two or more polypeptide sequences.

The terms "percent identity" and "% identity," as applied to polynucleotide sequences, refer to the percentage of residue matches between at least two polynucleotide sequences aligned using a standardized algorithm. Such an algorithm may insert, in a standardized and reproducible way, gaps in the sequences being compared in order to optimize alignment between two sequences, and therefore achieve a more meaningful comparison of the two sequences.

Percent identity between polynucleotide sequences may be determined using the default parameters of the CLUSTAL V algorithm as incorporated into the MEGALIGN version 3.12e sequence alignment program. This program is part of the LASERGENE software package, a suite of molecular biological analysis programs (DNASTAR, Madison WI). CLUSTAL V is described in Higgins, D.G. and P.M. Sharp (1989) CABIOS 5:151-153 and in Higgins, D.G. et al. (1992) CABIOS 8:189-191. For pairwise alignments of polynucleotide sequences, the default parameters are set as follows: Ktuple=2, gap penalty=5, window=4, and "diagonals saved"=4. The "weighted" residue weight table is selected as the default. Percent identity is reported by CLUSTAL V as the "percent similarity" between aligned polynucleotide sequences.

Alternatively, a suite of commonly used and freely available sequence comparison algorithms is provided by the National Center for Biotechnology Information (NCBI) Basic Local Alignment Search Tool (BLAST) (Altschul, S.F. et al. (1990) J. Mol. Biol. 215:403-410), which is available from several sources, including the NCBI, Bethesda, MD, and on the Internet at <http://www.ncbi.nlm.nih.gov/BLAST/>. The BLAST software suite includes various sequence analysis programs including "blastn," that is used to align a known polynucleotide sequence with other polynucleotide sequences from a variety of databases. Also available is a tool called "BLAST 2 Sequences" that is used for direct pairwise comparison of two nucleotide sequences. "BLAST 2 Sequences" can be accessed and used interactively at <http://www.ncbi.nlm.nih.gov/gorf/bl2.html>. The "BLAST 2 Sequences" tool can be used for both blastn and blastp (discussed below). BLAST programs are commonly used with gap and other parameters set to default settings. For example, to compare two nucleotide sequences, one may use blastn with the "BLAST 2 Sequences" tool Version 2.0.12 (April-21-2000) set at default parameters. Such default parameters may be, for example:

Matrix: BLOSUM62

Reward for match: 1

Penalty for mismatch: -2

Open Gap: 5 and Extension Gap: 2 penalties

Gap x drop-off: 50

5 *Expect: 10*

Word Size: 11

Filter: on

Percent identity may be measured over the length of an entire defined sequence, for example, as defined by a particular SEQ ID number, or may be measured over a shorter length, for example, over
10 the length of a fragment taken from a larger, defined sequence, for instance, a fragment of at least 20, at least 30, at least 40, at least 50, at least 70, at least 100, or at least 200 contiguous nucleotides. Such lengths are exemplary only, and it is understood that any fragment length supported by the sequences shown herein, in the tables, figures, or Sequence Listing, may be used to describe a length over which percentage identity may be measured.

15 Nucleic acid sequences that do not show a high degree of identity may nevertheless encode similar amino acid sequences due to the degeneracy of the genetic code. It is understood that changes in a nucleic acid sequence can be made using this degeneracy to produce multiple nucleic acid sequences that all encode substantially the same protein.

The phrases "percent identity" and "% identity," as applied to polypeptide sequences, refer to
20 the percentage of residue matches between at least two polypeptide sequences aligned using a standardized algorithm. Methods of polypeptide sequence alignment are well-known. Some alignment methods take into account conservative amino acid substitutions. Such conservative substitutions, explained in more detail above, generally preserve the charge and hydrophobicity at the site of substitution, thus preserving the structure (and therefore function) of the polypeptide.

25 Percent identity between polypeptide sequences may be determined using the default parameters of the CLUSTAL V algorithm as incorporated into the MEGALIGN version 3.12e sequence alignment program (described and referenced above). For pairwise alignments of polypeptide sequences using CLUSTAL V, the default parameters are set as follows: Ktuple=1, gap penalty=3, window=5, and "diagonals saved"=5. The PAM250 matrix is selected as the default residue weight table. As with
30 polynucleotide alignments, the percent identity is reported by CLUSTAL V as the "percent similarity" between aligned polypeptide sequence pairs.

Alternatively the NCBI BLAST software suite may be used. For example, for a pairwise comparison of two polypeptide sequences, one may use the "BLAST 2 Sequences" tool Version 2.0.12 (Apr-21-2000) with blastp set at default parameters. Such default parameters may be, for example:

35 *Matrix: BLOSUM62*

Open Gap: 11 and Extension Gap: 1 penalties

Gap x drop-off: 50

Expect: 10

Word Size: 3

5 *Filter: on*

Percent identity may be measured over the length of an entire defined polypeptide sequence, for example, as defined by a particular SEQ ID number, or may be measured over a shorter length, for example, over the length of a fragment taken from a larger, defined polypeptide sequence, for instance, a fragment of at least 15, at least 20, at least 30, at least 40, at least 50, at least 70 or at least 150
10 contiguous residues. Such lengths are exemplary only, and it is understood that any fragment length supported by the sequences shown herein, in the tables, figures or Sequence Listing, may be used to describe a length over which percentage identity may be measured.

"Human artificial chromosomes" (HACs) are linear microchromosomes which may contain DNA sequences of about 6 kb to 10 Mb in size, and which contain all of the elements required for
15 chromosome replication, segregation and maintenance.

The term "humanized antibody" refers to an antibody molecule in which the amino acid sequence in the non-antigen binding regions has been altered so that the antibody more closely resembles a human antibody, and still retains its original binding ability.

"Hybridization" refers to the process by which a polynucleotide strand anneals with a
20 complementary strand through base pairing under defined hybridization conditions. Specific hybridization is an indication that two nucleic acid sequences share a high degree of complementarity. Specific hybridization complexes form under permissive annealing conditions and remain hybridized after the "washing" step(s). The washing step(s) is particularly important in determining the stringency of the hybridization process, with more stringent conditions allowing less non-specific binding, i.e.,
25 binding between pairs of nucleic acid strands that are not perfectly matched. Permissive conditions for annealing of nucleic acid sequences are routinely determinable by one of ordinary skill in the art and may be consistent among hybridization experiments, whereas wash conditions may be varied among experiments to achieve the desired stringency, and therefore hybridization specificity. Permissive annealing conditions occur, for example, at 68°C in the presence of about 6 x SSC, about 1% (w/v)
30 SDS, and about 100 µg/ml sheared, denatured salmon sperm DNA.

Generally, stringency of hybridization is expressed, in part, with reference to the temperature under which the wash step is carried out. Such wash temperatures are typically selected to be about 5°C to 20°C lower than the thermal melting point (T_m) for the specific sequence at a defined ionic strength and pH. The T_m is the temperature (under defined ionic strength and pH) at which 50% of the
35 target sequence hybridizes to a perfectly matched probe. An equation for calculating T_m and conditions

for nucleic acid hybridization are well known and can be found in Sambrook, J. et al., 1989, Molecular Cloning: A Laboratory Manual, 2nd ed., vol. 1-3, Cold Spring Harbor Press, Plainview NY; specifically see volume 2, chapter 9.

High stringency conditions for hybridization between polynucleotides of the present invention include wash conditions of 68°C in the presence of about 0.2 x SSC and about 0.1% SDS, for 1 hour. Alternatively, temperatures of about 65°C, 60°C, 55°C, or 42°C may be used. SSC concentration may be varied from about 0.1 to 2 x SSC, with SDS being present at about 0.1%. Typically, blocking reagents are used to block non-specific hybridization. Such blocking reagents include, for instance, sheared and denatured salmon sperm DNA at about 100-200 µg/ml. Organic solvent, such as formamide at a concentration of about 35-50% v/v, may also be used under particular circumstances, such as for RNA:DNA hybridizations. Useful variations on these wash conditions will be readily apparent to those of ordinary skill in the art. Hybridization, particularly under high stringency conditions, may be suggestive of evolutionary similarity between the nucleotides. Such similarity is strongly indicative of a similar role for the nucleotides and their encoded polypeptides.

The term "hybridization complex" refers to a complex formed between two nucleic acid sequences by virtue of the formation of hydrogen bonds between complementary bases. A hybridization complex may be formed in solution (e.g., C₀t or R₀t analysis) or formed between one nucleic acid sequence present in solution and another nucleic acid sequence immobilized on a solid support (e.g., paper, membranes, filters, chips, pins or glass slides, or any other appropriate substrate to which cells or their nucleic acids have been fixed).

The words "insertion" and "addition" refer to changes in an amino acid or nucleotide sequence resulting in the addition of one or more amino acid residues or nucleotides, respectively.

"Immune response" can refer to conditions associated with inflammation, trauma, immune disorders, or infectious or genetic disease, etc. These conditions can be characterized by expression of various factors, e.g., cytokines, chemokines, and other signaling molecules, which may affect cellular and systemic defense systems.

An "immunogenic fragment" is a polypeptide or oligopeptide fragment of GBAP which is capable of eliciting an immune response when introduced into a living organism, for example, a mammal. The term "immunogenic fragment" also includes any polypeptide or oligopeptide fragment of GBAP which is useful in any of the antibody production methods disclosed herein or known in the art.

The term "microarray" refers to an arrangement of a plurality of polynucleotides, polypeptides, or other chemical compounds on a substrate.

The terms "element" and "array element" refer to a polynucleotide, polypeptide, or other chemical compound having a unique and defined position on a microarray.

The term "modulate" refers to a change in the activity of GBAP. For example, modulation

may cause an increase or a decrease in protein activity, binding characteristics, or any other biological, functional, or immunological properties of GBAP.

The phrases "nucleic acid" and "nucleic acid sequence" refer to a nucleotide, oligonucleotide, polynucleotide, or any fragment thereof. These phrases also refer to DNA or RNA of genomic or synthetic origin which may be single-stranded or double-stranded and may represent the sense or the antisense strand, to peptide nucleic acid (PNA), or to any DNA-like or RNA-like material.

"Operably linked" refers to the situation in which a first nucleic acid sequence is placed in a functional relationship with a second nucleic acid sequence. For instance, a promoter is operably linked to a coding sequence if the promoter affects the transcription or expression of the coding sequence. Operably linked DNA sequences may be in close proximity or contiguous and, where necessary to join two protein coding regions, in the same reading frame.

"Peptide nucleic acid" (PNA) refers to an antisense molecule or anti-gene agent which comprises an oligonucleotide of at least about 5 nucleotides in length linked to a peptide backbone of amino acid residues ending in lysine. The terminal lysine confers solubility to the composition. PNAs preferentially bind complementary single stranded DNA or RNA and stop transcript elongation, and may be pegylated to extend their lifespan in the cell.

"Post-translational modification" of an GBAP may involve lipidation, glycosylation, phosphorylation, acetylation, racemization, proteolytic cleavage, and other modifications known in the art. These processes may occur synthetically or biochemically. Biochemical modifications will vary by cell type depending on the enzymatic milieu of GBAP.

"Probe" refers to nucleic acid sequences encoding GBAP, their complements, or fragments thereof, which are used to detect identical, allelic or related nucleic acid sequences. Probes are isolated oligonucleotides or polynucleotides attached to a detectable label or reporter molecule. Typical labels include radioactive isotopes, ligands, chemiluminescent agents, and enzymes. "Primers" are short nucleic acids, usually DNA oligonucleotides, which may be annealed to a target polynucleotide by complementary base-pairing. The primer may then be extended along the target DNA strand by a DNA polymerase enzyme. Primer pairs can be used for amplification (and identification) of a nucleic acid sequence, e.g., by the polymerase chain reaction (PCR).

Probes and primers as used in the present invention typically comprise at least 15 contiguous nucleotides of a known sequence. In order to enhance specificity, longer probes and primers may also be employed, such as probes and primers that comprise at least 20, 25, 30, 40, 50, 60, 70, 80, 90, 100, or at least 150 consecutive nucleotides of the disclosed nucleic acid sequences. Probes and primers may be considerably longer than these examples, and it is understood that any length supported by the specification, including the tables, figures, and Sequence Listing, may be used.

Methods for preparing and using probes and primers are described in the references, for

example Sambrook, J. et al., 1989, Molecular Cloning: A Laboratory Manual, 2nd ed., vol. 1-3, Cold Spring Harbor Press, Plainview NY; Ausubel, F.M. et al., 1987, Current Protocols in Molecular Biology, Greene Publ. Assoc. & Wiley-Intersciences, New York NY; Innis, M. et al., 1990, PCR Protocols, A Guide to Methods and Applications, Academic Press, San Diego CA. PCR primer pairs
5 can be derived from a known sequence, for example, by using computer programs intended for that purpose such as Primer (Version 0.5, 1991, Whitehead Institute for Biomedical Research, Cambridge MA).

Oligonucleotides for use as primers are selected using software known in the art for such purpose. For example, OLIGO 4.06 software is useful for the selection of PCR primer pairs of up to
10 100 nucleotides each, and for the analysis of oligonucleotides and larger polynucleotides of up to 5,000 nucleotides from an input polynucleotide sequence of up to 32 kilobases. Similar primer selection programs have incorporated additional features for expanded capabilities. For example, the PrimOU primer selection program (available to the public from the Genome Center at University of Texas South West Medical Center, Dallas TX) is capable of choosing specific primers from megabase sequences
15 and is thus useful for designing primers on a genome-wide scope. The Primer3 primer selection program (available to the public from the Whitehead Institute/MIT Center for Genome Research, Cambridge MA) allows the user to input a "mispriming library," in which sequences to avoid as primer binding sites are user-specified. Primer3 is useful, in particular, for the selection of oligonucleotides for microarrays. (The source code for the latter two primer selection programs may also be obtained from
20 their respective sources and modified to meet the user's specific needs.) The PrimeGen program (available to the public from the UK Human Genome Mapping Project Resource Centre, Cambridge UK) designs primers based on multiple sequence alignments, thereby allowing selection of primers that hybridize to either the most conserved or least conserved regions of aligned nucleic acid sequences. Hence, this program is useful for identification of both unique and conserved oligonucleotides and
25 polynucleotide fragments. The oligonucleotides and polynucleotide fragments identified by any of the above selection methods are useful in hybridization technologies, for example, as PCR or sequencing primers, microarray elements, or specific probes to identify fully or partially complementary polynucleotides in a sample of nucleic acids. Methods of oligonucleotide selection are not limited to those described above.

30 A "recombinant nucleic acid" is a sequence that is not naturally occurring or has a sequence that is made by an artificial combination of two or more otherwise separated segments of sequence. This artificial combination is often accomplished by chemical synthesis or, more commonly, by the artificial manipulation of isolated segments of nucleic acids, e.g., by genetic engineering techniques such as those described in Sambrook, supra. The term recombinant includes nucleic acids that have
35 been altered solely by addition, substitution, or deletion of a portion of the nucleic acid. Frequently, a

recombinant nucleic acid may include a nucleic acid sequence operably linked to a promoter sequence. Such a recombinant nucleic acid may be part of a vector that is used, for example, to transform a cell.

Alternatively, such recombinant nucleic acids may be part of a viral vector, e.g., based on a vaccinia virus, that could be used to vaccinate a mammal wherein the recombinant nucleic acid is expressed, inducing a protective immunological response in the mammal.

A "regulatory element" refers to a nucleic acid sequence usually derived from untranslated regions of a gene and includes enhancers, promoters, introns, and 5' and 3' untranslated regions (UTRs). Regulatory elements interact with host or viral proteins which control transcription, translation, or RNA stability.

10 "Reporter molecules" are chemical or biochemical moieties used for labeling a nucleic acid, amino acid, or antibody. Reporter molecules include radionuclides; enzymes; fluorescent, chemiluminescent, or chromogenic agents; substrates; cofactors; inhibitors; magnetic particles; and other moieties known in the art.

An "RNA equivalent," in reference to a DNA sequence, is composed of the same linear
15 sequence of nucleotides as the reference DNA sequence with the exception that all occurrences of the nitrogenous base thymine are replaced with uracil, and the sugar backbone is composed of ribose instead of deoxyribose.

The term "sample" is used in its broadest sense. A sample suspected of containing nucleic acids encoding GBAP, or fragments thereof, or GBAP itself, may comprise a bodily fluid; an extract
20 from a cell, chromosome, organelle, or membrane isolated from a cell; a cell; genomic DNA, RNA, or cDNA, in solution or bound to a substrate; a tissue; a tissue print; etc.

The terms "specific binding" and "specifically binding" refer to that interaction between a protein or peptide and an agonist, an antibody, an antagonist, a small molecule, or any natural or synthetic binding composition. The interaction is dependent upon the presence of a particular structure
25 of the protein, e.g., the antigenic determinant or epitope, recognized by the binding molecule. For example, if an antibody is specific for epitope "A," the presence of a polypeptide comprising the epitope A, or the presence of free unlabeled A, in a reaction containing free labeled A and the antibody will reduce the amount of labeled A that binds to the antibody.

The term "substantially purified" refers to nucleic acid or amino acid sequences that are
30 removed from their natural environment and are isolated or separated, and are at least 60% free, preferably at least 75% free, and most preferably at least 90% free from other components with which they are naturally associated.

A "substitution" refers to the replacement of one or more amino acid residues or nucleotides by different amino acid residues or nucleotides, respectively.

35 "Substrate" refers to any suitable rigid or semi-rigid support including membranes, filters,

chips, slides, wafers, fibers, magnetic or nonmagnetic beads, gels, tubing, plates, polymers, microparticles and capillaries. The substrate can have a variety of surface forms, such as wells, trenches, pins, channels and pores, to which polynucleotides or polypeptides are bound.

A "transcript image" refers to the collective pattern of gene expression by a particular cell type
5 or tissue under given conditions at a given time.

"Transformation" describes a process by which exogenous DNA is introduced into a recipient cell. Transformation may occur under natural or artificial conditions according to various methods well known in the art, and may rely on any known method for the insertion of foreign nucleic acid sequences into a prokaryotic or eukaryotic host cell. The method for transformation is selected based on the type
10 of host cell being transformed and may include, but is not limited to, bacteriophage or viral infection, electroporation, heat shock, lipofection, and particle bombardment. The term "transformed" cells includes stably transformed cells in which the inserted DNA is capable of replication either as an autonomously replicating plasmid or as part of the host chromosome, as well as transiently transformed cells which express the inserted DNA or RNA for limited periods of time.

A "transgenic organism," as used herein, is any organism, including but not limited to animals and plants, in which one or more of the cells of the organism contains heterologous nucleic acid introduced by way of human intervention, such as by transgenic techniques well known in the art. The nucleic acid is introduced into the cell, directly or indirectly by introduction into a precursor of the cell, by way of deliberate genetic manipulation, such as by microinjection or by infection with
20 a recombinant virus. The term genetic manipulation does not include classical cross-breeding, or in vitro fertilization, but rather is directed to the introduction of a recombinant DNA molecule. The transgenic organisms contemplated in accordance with the present invention include bacteria, cyanobacteria, fungi, plants, and animals. The isolated DNA of the present invention can be introduced into the host by methods known in the art, for example infection, transfection,
25 transformation or transconjugation. Techniques for transferring the DNA of the present invention into such organisms are widely known and provided in references such as Sambrook et al. (1989), supra.

A "variant" of a particular nucleic acid sequence is defined as a nucleic acid sequence having at least 40% sequence identity to the particular nucleic acid sequence over a certain length of one of the
30 nucleic acid sequences using blastn with the "BLAST 2 Sequences" tool Version 2.0.9 (May-07-1999) set at default parameters. Such a pair of nucleic acids may show, for example, at least 50%, at least 60%, at least 70%, at least 80%, at least 85%, at least 90%, at least 95% or at least 98% or greater sequence identity over a certain defined length. A variant may be described as, for example, an "allelic" (as defined above), "splice," "species," or "polymorphic" variant. A splice variant may have significant
35 identity to a reference molecule, but will generally have a greater or lesser number of polynucleotides

due to alternative splicing of exons during mRNA processing. The corresponding polypeptide may possess additional functional domains or lack domains that are present in the reference molecule.

Species variants are polynucleotide sequences that vary from one species to another. The resulting polypeptides generally will have significant amino acid identity relative to each other. A polymorphic
 5 variant is a variation in the polynucleotide sequence of a particular gene between individuals of a given species. Polymorphic variants also may encompass "single nucleotide polymorphisms" (SNPs) in which the polynucleotide sequence varies by one nucleotide base. The presence of SNPs may be indicative of, for example, a certain population, a disease state, or a propensity for a disease state.

A "variant" of a particular polypeptide sequence is defined as a polypeptide sequence having at
 10 least 40% sequence identity to the particular polypeptide sequence over a certain length of one of the polypeptide sequences using blastp with the "BLAST 2 Sequences" tool Version 2.0.9 (May-07-1999) set at default parameters. Such a pair of polypeptides may show, for example, at least 50%, at least 60%, at least 70%, at least 80%, at least 90%, at least 95%, or at least 98% or greater sequence identity over a certain defined length of one of the polypeptides.

15 THE INVENTION

The invention is based on the discovery of new human GTP-binding associated proteins (GBAP), the polynucleotides encoding GBAP, and the use of these compositions for the diagnosis, treatment, or prevention of immune system, reproductive, nervous system, and cell signaling disorders, and cell proliferative disorders including cancer.

20 Table 1 lists the Incyte clones used to assemble full length nucleotide sequences encoding GBAP. Columns 1 and 2 show the sequence identification numbers (SEQ ID NOs) of the polypeptide and nucleotide sequences, respectively. Column 3 shows the clone IDs of the Incyte clones in which nucleic acids encoding each GBAP were identified, and column 4 shows the cDNA libraries from which these clones were isolated. Column 5 shows Incyte clones and their corresponding cDNA libraries.

25 Clones for which cDNA libraries are not indicated were derived from pooled cDNA libraries. In some cases, GenBank sequence identifiers are also shown in column 5. The Incyte clones and GenBank cDNA sequences, where indicated, in column 5 were used to assemble the consensus nucleotide sequence of each GBAP and are useful as fragments in hybridization technologies.

The columns of Table 2 show various properties of each of the polypeptides of the invention:
 30 column 1 references the SEQ ID NO; column 2 shows the number of amino acid residues in each polypeptide; column 3 shows potential phosphorylation sites; column 4 shows potential glycosylation sites; column 5 shows the amino acid residues comprising signature sequences and motifs; column 6 shows homologous sequences as identified by BLAST analysis; and column 7 shows analytical methods and in some cases, searchable databases to which the analytical methods were applied. The methods of
 35 column 7 were used to characterize each polypeptide through sequence homology and protein motifs.

The columns of Table 3 show the tissue-specificity and diseases, disorders, or conditions associated with nucleotide sequences encoding GBAP. The first column of Table 3 lists the nucleotide SEQ ID NOs. Column 2 lists fragments of the nucleotide sequences of column 1. These fragments are useful, for example, in hybridization or amplification technologies to identify SEQ ID NO:67-132 and to distinguish between SEQ ID NO:67-132 and related polynucleotide sequences. The polypeptides encoded by these fragments are useful, for example, as immunogenic peptides. Column 3 lists tissue categories which express GBAP as a fraction of total tissues expressing GBAP. Column 4 lists diseases, disorders, or conditions associated with those tissues expressing GBAP as a fraction of total tissues expressing GBAP. Column 5 lists the vectors used to subclone each cDNA library. Of particular note is the expression of SEQ ID NO:84 in lung tissues, and the tissue-specific expression of SEQ ID NO:132. Over 90% of tissues expressing SEQ ID NO:132 are derived from the nervous system, particularly the brain.

The columns of Table 4 show descriptions of the tissues used to construct the cDNA libraries from which cDNA clones encoding GBAP were isolated. Column 1 references the nucleotide SEQ ID NOs, column 2 shows the cDNA libraries from which these clones were isolated, and column 3 shows the tissue origins and other descriptive information relevant to the cDNA libraries in column 2.

SEQ ID NO:70 maps to chromosome 7 within the interval from 111.6 to 123.4 centiMorgans. This interval contains a gene that is down regulated in adenoma. SEQ ID NO:74 maps to chromosome 11 within the interval from 104.8 to 123.5 centiMorgans. This interval contains a gene associated with the cerebellar degenerative disorder, ataxia telangiectasia. SEQ ID NO:75 maps to chromosome 17 within the interval from 62.9 to 65.0 centiMorgans. SEQ ID NO:77 maps to chromosome 3 within the interval from 12.9 to 16.5 centiMorgans. SEQ ID NO:80 maps to chromosome 9 within the interval from 42.0 to 57.3 centiMorgans. SEQ ID NO:86 maps to chromosome 1 within the interval from 159.6 to 164.1 centiMorgans. SEQ ID NO:87 maps to chromosome 11 within the interval from 147.2 to 151.6. SEQ ID NO:90 maps to chromosome 1 within the interval from 219.2 to 223.0 centiMorgans. This interval contains a gene encoding a RAB interacting protein. SEQ ID NO:92 and SEQ ID NO:106 both map to chromosome 1 within the interval from 48.8 to 81.6 centiMorgans. This interval also contains genes associated with familial hypercholesterolemia, glucose transport defect, infantile hypophosphatasia, infantile neuronal ceroid lipofuscinosis, Kostmann disease, multiple epiphyseal dysplasia, porphyria cutanea tarda, and T-cell acute lymphocytic leukemia 1. SEQ ID NO:93 maps to chromosome 12 within the interval from 76.5 to 87.6 centiMorgans. This interval also contains genes associated with mucopolysaccharidosis type IIID, pseudovitamin D deficiency rickets, and renal amyloidosis. SEQ ID NO:94 and SEQ ID NO:109 both map to chromosome 1 within the interval from 143.1 to 146.6 centiMorgans, to chromosome 14 within the interval from 46.8 to 50.9 centiMorgans, to chromosome 16 within the interval from 88.1 to 90.2 centiMorgans, and to chromosome 19 within the

interval from 58.7 to 97.5 centiMorgans. The interval on chromosome 14 from 46.8 to 50.9 centiMorgans also contains a gene associated with dopa-responsive dystonia. The interval on chromosome 19 from 58.7 to 97.5 centiMorgans also contains genes associated with colorectal cancer, DNA ligase I deficiency, glutaricaciduria IIB, myotonic dystrophy, renal amyloidosis, T-cell acute lymphoblastic leukemia, and xeroderma pigmentosum D. SEQ ID NO:97 maps to chromosome 2 within the interval from 236.2 to 269.5 centiMorgans. This interval also contains genes associated with Crigler-Najjar syndrome, familial hypercholesterolemia, Oguchi disease, and primary hyperoxaluria. SEQ ID NO:101 maps to chromosome 2 within the interval from 225.6 to 233.1 centiMorgans, to chromosome 6 within the interval from 132.7 to 144.4 centiMorgans, and to chromosome 11 within the interval from 117.9 to 120.8 centiMorgans. The interval on chromosome 2 from 225.6 to 233.1 centiMorgans also contains a gene associated with Waardenburg syndrome 1. The interval on chromosome 6 from 132.7 to 144.4 centiMorgans also contains genes associated with familial disseminated atypical mycobacterial infection and rhizomelic chondrodysplasia punctata. The interval on chromosome 11 from 117.9 to 120.8 centiMorgans also contains a gene associated with acute intermittent porphyria. SEQ ID NO:111 maps to chromosome 19 within the interval from 35.5 to 49.4 centiMorgans, to chromosome 1 within the interval from the p-terminus to 16.4 centiMorgans, and to chromosome 11 within the interval from 147.2 centiMorgans to the q-terminus. SEQ ID NO:112 maps to chromosome 19 within the interval from 41.7 to 49.4 centiMorgans. SEQ ID NO:113 maps to chromosome 9 within the interval from 136.2 to 163.0 centiMorgans. SEQ ID NO:115 maps to chromosome 14 within the interval from 95.5 to 103.7 centiMorgans and to the X chromosome (23) within the interval from the p-terminus to 55.5 centiMorgans. SEQ ID NO:117 maps to chromosome 13 at 46.9 centiMorgans. SEQ ID NO:118 maps to chromosome 1 within the interval from 16.4 to 22.9 centiMorgans. SEQ ID NO:121 maps to chromosome 12 within the interval from 116.6 to 118.9 centiMorgans. SEQ ID NO:128 maps to chromosome 1 within the interval from the p-terminus to 16.4 centiMorgans.

The invention also encompasses GBAP variants. A preferred GBAP variant is one which has at least about 80%, or alternatively at least about 90%, or even at least about 95% amino acid sequence identity to the GBAP amino acid sequence, and which contains at least one functional or structural characteristic of GBAP.

The invention also encompasses polynucleotides which encode GBAP. In a particular embodiment, the invention encompasses a polynucleotide sequence comprising a sequence selected from the group consisting of SEQ ID NO:67-132, which encodes GBAP. The polynucleotide sequences of SEQ ID NO:67-132, as presented in the Sequence Listing, embrace the equivalent RNA sequences, wherein occurrences of the nitrogenous base thymine are replaced with uracil, and the sugar backbone is composed of ribose instead of deoxyribose.

The invention also encompasses a variant of a polynucleotide sequence encoding GBAP. In particular, such a variant polynucleotide sequence will have at least about 70%, or alternatively at least about 85%, or even at least about 95% polynucleotide sequence identity to the polynucleotide sequence encoding GBAP. A particular aspect of the invention encompasses a variant of a polynucleotide
5 sequence comprising a sequence selected from the group consisting of SEQ ID NO:67-132 which has at least about 70%, or alternatively at least about 85%, or even at least about 95% polynucleotide sequence identity to a nucleic acid sequence selected from the group consisting of SEQ ID NO:67-132. Any one of the polynucleotide variants described above can encode an amino acid sequence which contains at least one functional or structural characteristic of GBAP.

10 It will be appreciated by those skilled in the art that as a result of the degeneracy of the genetic code, a multitude of polynucleotide sequences encoding GBAP, some bearing minimal similarity to the polynucleotide sequences of any known and naturally occurring gene, may be produced. Thus, the invention contemplates each and every possible variation of polynucleotide sequence that could be made by selecting combinations based on possible codon choices. These combinations are made in
15 accordance with the standard triplet genetic code as applied to the polynucleotide sequence of naturally occurring GBAP, and all such variations are to be considered as being specifically disclosed.

Although nucleotide sequences which encode GBAP and its variants are generally capable of hybridizing to the nucleotide sequence of the naturally occurring GBAP under appropriately selected conditions of stringency, it may be advantageous to produce nucleotide sequences encoding GBAP or its
20 derivatives possessing a substantially different codon usage, e.g., inclusion of non-naturally occurring codons. Codons may be selected to increase the rate at which expression of the peptide occurs in a particular prokaryotic or eukaryotic host in accordance with the frequency with which particular codons are utilized by the host. Other reasons for substantially altering the nucleotide sequence encoding GBAP and its derivatives without altering the encoded amino acid sequences include the production of
25 RNA transcripts having more desirable properties, such as a greater half-life, than transcripts produced from the naturally occurring sequence.

The invention also encompasses production of DNA sequences which encode GBAP and GBAP derivatives, or fragments thereof, entirely by synthetic chemistry. After production, the synthetic sequence may be inserted into any of the many available expression vectors and cell systems
30 using reagents well known in the art. Moreover, synthetic chemistry may be used to introduce mutations into a sequence encoding GBAP or any fragment thereof.

Also encompassed by the invention are polynucleotide sequences that are capable of hybridizing to the claimed polynucleotide sequences, and, in particular, to those shown in SEQ ID NO:67-132 and fragments thereof under various conditions of stringency. (See, e.g., Wahl, G.M. and
35 S.L. Berger (1987) Methods Enzymol. 152:399-407; Kimmel, A.R. (1987) Methods Enzymol.

152:507-511.) Hybridization conditions, including annealing and wash conditions, are described in "Definitions."

Methods for DNA sequencing are well known in the art and may be used to practice any of the embodiments of the invention. The methods may employ such enzymes as the Klenow fragment of DNA polymerase I, SEQUENASE (US Biochemical, Cleveland OH), Taq polymerase (PE Biosystems, Foster City CA), thermostable T7 polymerase (Amersham Pharmacia Biotech, Piscataway NJ), or combinations of polymerases and proofreading exonucleases such as those found in the ELONGASE amplification system (Life Technologies, Gaithersburg MD). Preferably, sequence preparation is automated with machines such as the MICROLAB 2200 liquid transfer system (Hamilton, Reno NV), PTC200 thermal cycler (MJ Research, Watertown MA) and ABI CATALYST 800 thermal cycler (PE Biosystems). Sequencing is then carried out using either the ABI 373 or 377 DNA sequencing system (PE Biosystems), the MEGABACE 1000 DNA sequencing system (Molecular Dynamics, Sunnyvale CA), or other systems known in the art. The resulting sequences are analyzed using a variety of algorithms which are well known in the art. (See, e.g., Ausubel, F.M. (1997) Short Protocols in Molecular Biology, John Wiley & Sons, New York NY, unit 7.7; Meyers, R.A. (1995) Molecular Biology and Biotechnology, Wiley VCH, New York NY, pp. 856-853.)

The nucleic acid sequences encoding GBAP may be extended utilizing a partial nucleotide sequence and employing various PCR-based methods known in the art to detect upstream sequences, such as promoters and regulatory elements. For example, one method which may be employed, restriction-site PCR, uses universal and nested primers to amplify unknown sequence from genomic DNA within a cloning vector. (See, e.g., Sarkar, G. (1993) PCR Methods Applic. 2:318-322.) Another method, inverse PCR, uses primers that extend in divergent directions to amplify unknown sequence from a circularized template. The template is derived from restriction fragments comprising a known genomic locus and surrounding sequences. (See, e.g., Triglia, T. et al. (1988) Nucleic Acids Res. 16:8186.) A third method, capture PCR, involves PCR amplification of DNA fragments adjacent to known sequences in human and yeast artificial chromosome DNA. (See, e.g., Lagerstrom, M. et al. (1991) PCR Methods Applic. 1:111-119.) In this method, multiple restriction enzyme digestions and ligations may be used to insert an engineered double-stranded sequence into a region of unknown sequence before performing PCR. Other methods which may be used to retrieve unknown sequences are known in the art. (See, e.g., Parker, J.D. et al. (1991) Nucleic Acids Res. 19:3055-3060). Additionally, one may use PCR, nested primers, and PROMOTERFINDER libraries (Clontech, Palo Alto CA) to walk genomic DNA. This procedure avoids the need to screen libraries and is useful in finding intron/exon junctions. For all PCR-based methods, primers may be designed using commercially available software, such as OLIGO 4.06 Primer Analysis software (National Biosciences, Plymouth MN) or another appropriate program, to be about 22 to 30 nucleotides in length, to have a

GC content of about 50% or more, and to anneal to the template at temperatures of about 68°C to 72°C.

When screening for full-length cDNAs, it is preferable to use libraries that have been size-selected to include larger cDNAs. In addition, random-primed libraries, which often include
5 sequences containing the 5' regions of genes, are preferable for situations in which an oligo d(T) library does not yield a full-length cDNA. Genomic libraries may be useful for extension of sequence into 5' non-transcribed regulatory regions.

Capillary electrophoresis systems which are commercially available may be used to analyze the size or confirm the nucleotide sequence of sequencing or PCR products. In particular, capillary
10 sequencing may employ flowable polymers for electrophoretic separation, four different nucleotide-specific, laser-stimulated fluorescent dyes, and a charge coupled device camera for detection of the emitted wavelengths. Output/light intensity may be converted to electrical signal using appropriate software (e.g., GENOTYPER and SEQUENCE NAVIGATOR, PE Biosystems), and the entire process from loading of samples to computer analysis and electronic data display may be computer
15 controlled. Capillary electrophoresis is especially preferable for sequencing small DNA fragments which may be present in limited amounts in a particular sample.

In another embodiment of the invention, polynucleotide sequences or fragments thereof which encode GBAP may be cloned in recombinant DNA molecules that direct expression of GBAP, or fragments or functional equivalents thereof, in appropriate host cells. Due to the inherent degeneracy of
20 the genetic code, other DNA sequences which encode substantially the same or a functionally equivalent amino acid sequence may be produced and used to express GBAP.

The nucleotide sequences of the present invention can be engineered using methods generally known in the art in order to alter GBAP-encoding sequences for a variety of purposes including, but not limited to, modification of the cloning, processing, and/or expression of the gene product. DNA
25 shuffling by random fragmentation and PCR reassembly of gene fragments and synthetic oligonucleotides may be used to engineer the nucleotide sequences. For example, oligonucleotide-mediated site-directed mutagenesis may be used to introduce mutations that create new restriction sites, alter glycosylation patterns, change codon preference, produce splice variants, and so forth.

The nucleotides of the present invention may be subjected to DNA shuffling techniques such
30 as MOLECULARBREEDING (Maxygen Inc., Santa Clara CA; described in U.S. Patent Number 5,837,458; Chang, C.-C. et al. (1999) Nat. Biotechnol. 17:793-797; Christians, F.C. et al. (1999) Nat. Biotechnol. 17:259-264; and Cramer, A. et al. (1996) Nat. Biotechnol. 14:315-319) to alter or improve the biological properties of GBAP, such as its biological or enzymatic activity or its ability to bind to other molecules or compounds. DNA shuffling is a process by which a library of gene
35 variants is produced using PCR-mediated recombination of gene fragments. The library is then

subjected to selection or screening procedures that identify those gene variants with the desired properties. These preferred variants may then be pooled and further subjected to recursive rounds of DNA shuffling and selection/screening. Thus, genetic diversity is created through "artificial" breeding and rapid molecular evolution. For example, fragments of a single gene containing random point mutations may be recombined, screened, and then reshuffled until the desired properties are optimized. Alternatively, fragments of a given gene may be recombined with fragments of homologous genes in the same gene family, either from the same or different species, thereby maximizing the genetic diversity of multiple naturally occurring genes in a directed and controllable manner.

10 In another embodiment, sequences encoding GBAP may be synthesized, in whole or in part, using chemical methods well known in the art. (See, e.g., Caruthers, M.H. et al. (1980) *Nucleic Acids Symp. Ser. 7*:215-223; and Horn, T. et al. (1980) *Nucleic Acids Symp. Ser. 7*:225-232.) Alternatively, GBAP itself or a fragment thereof may be synthesized using chemical methods. For example, peptide synthesis can be performed using various solution-phase or solid-phase techniques. (See, e.g.,
15 Creighton, T. (1984) Proteins, Structures and Molecular Properties, WH Freeman, New York NY, pp. 55-60; and Roberge, J.Y. et al. (1995) *Science* 269:202-204.) Automated synthesis may be achieved using the ABI 431A peptide synthesizer (PE Biosystems). Additionally, the amino acid sequence of GBAP, or any part thereof, may be altered during direct synthesis and/or combined with sequences from other proteins, or any part thereof, to produce a variant polypeptide or a polypeptide having a
20 sequence of a naturally occurring polypeptide.

The peptide may be substantially purified by preparative high performance liquid chromatography. (See, e.g., Chiez, R.M. and F.Z. Regnier (1990) *Methods Enzymol.* 182:392-421.) The composition of the synthetic peptides may be confirmed by amino acid analysis or by sequencing. (See, e.g., Creighton, supra, pp. 28-53.)

25 In order to express a biologically active GBAP, the nucleotide sequences encoding GBAP or derivatives thereof may be inserted into an appropriate expression vector, i.e., a vector which contains the necessary elements for transcriptional and translational control of the inserted coding sequence in a suitable host. These elements include regulatory sequences, such as enhancers, constitutive and inducible promoters, and 5' and 3' untranslated regions in the vector and in polynucleotide sequences
30 encoding GBAP. Such elements may vary in their strength and specificity. Specific initiation signals may also be used to achieve more efficient translation of sequences encoding GBAP. Such signals include the ATG initiation codon and adjacent sequences, e.g. the Kozak sequence. In cases where sequences encoding GBAP and its initiation codon and upstream regulatory sequences are inserted into the appropriate expression vector, no additional transcriptional or translational control signals may be
35 needed. However, in cases where only coding sequence, or a fragment thereof, is inserted, exogenous

translational control signals including an in-frame ATG initiation codon should be provided by the vector. Exogenous translational elements and initiation codons may be of various origins, both natural and synthetic. The efficiency of expression may be enhanced by the inclusion of enhancers appropriate for the particular host cell system used. (See, e.g., Scharf, D. et al. (1994) Results Probl. Cell Differ. 5 20:125-162.)

Methods which are well known to those skilled in the art may be used to construct expression vectors containing sequences encoding GBAP and appropriate transcriptional and translational control elements. These methods include in vitro recombinant DNA techniques, synthetic techniques, and in vivo genetic recombination. (See, e.g., Sambrook, J. et al. (1989) Molecular Cloning, A Laboratory 10 Manual, Cold Spring Harbor Press, Plainview NY, ch. 4, 8, and 16-17; Ausubel, F.M. et al. (1995) Current Protocols in Molecular Biology, John Wiley & Sons, New York NY, ch. 9, 13, and 16.)

A variety of expression vector/host systems may be utilized to contain and express sequences encoding GBAP. These include, but are not limited to, microorganisms such as bacteria transformed with recombinant bacteriophage, plasmid, or cosmid DNA expression vectors; yeast transformed with 15 yeast expression vectors; insect cell systems infected with viral expression vectors (e.g., baculovirus); plant cell systems transformed with viral expression vectors (e.g., cauliflower mosaic virus, CaMV, or tobacco mosaic virus, TMV) or with bacterial expression vectors (e.g., Ti or pBR322 plasmids); or animal cell systems. (See, e.g., Sambrook, supra; Ausubel, supra; Van Heeke, G. and S.M. Schuster (1989) J. Biol. Chem. 264:5503-5509; Bitter, G.A. et al. (1987) Methods Enzymol. 153:516-544; 20 Scorer, C.A. et al. (1994) Bio/Technology 12:181-184; Engelhard, E.K. et al. (1994) Proc. Natl. Acad. Sci. USA 91:3224-3227; Sandig, V. et al. (1996) Hum. Gene Ther. 7:1937-1945; Takamatsu, N. (1987) EMBO J. 6:307-311; Coruzzi, G. et al. (1984) EMBO J. 3:1671-1680; Broglie, R. et al. (1984) Science 224:838-843; Winter, J. et al. (1991) Results Probl. Cell Differ. 17:85-105; The McGraw Hill Yearbook of Science and Technology (1992) McGraw Hill, New York NY, pp. 25 191-196; Logan, J. and T. Shenk (1984) Proc. Natl. Acad. Sci. USA 81:3655-3659; and Harrington, J.J. et al. (1997) Nat. Genet. 15:345-355.) Expression vectors derived from retroviruses, adenoviruses, or herpes or vaccinia viruses, or from various bacterial plasmids; may be used for delivery of nucleotide sequences to the targeted organ, tissue, or cell population. (See, e.g., Di Nicola, M. et al. (1998) Cancer Gen. Ther. 5(6):350-356; Yu, M. et al., (1993) Proc. Natl. Acad. Sci. 30 USA 90(13):6340-6344; Buller, R.M. et al. (1985) Nature 317(6040):813-815; McGregor, D.P. et al. (1994) Mol. Immunol. 31(3):219-226; and Verma, I.M. and N. Somia (1997) Nature 389:239-242.) The invention is not limited by the host cell employed.

In bacterial systems, a number of cloning and expression vectors may be selected depending upon the use intended for polynucleotide sequences encoding GBAP. For example, routine cloning, 35 subcloning, and propagation of polynucleotide sequences encoding GBAP can be achieved using a

multifunctional *E. coli* vector such as PBLUESCRIPT (Stratagene, La Jolla CA) or PSPT1 plasmid (Life Technologies). Ligation of sequences encoding GBAP into the vector's multiple cloning site disrupts the *lacZ* gene, allowing a colorimetric screening procedure for identification of transformed bacteria containing recombinant molecules. In addition, these vectors may be useful for *in vitro* transcription, dideoxy sequencing, single strand rescue with helper phage, and creation of nested deletions in the cloned sequence. (See, e.g., Van Heeke, G. and S.M. Schuster (1989) *J. Biol. Chem.* 264:5503-5509.) When large quantities of GBAP are needed, e.g. for the production of antibodies, vectors which direct high level expression of GBAP may be used. For example, vectors containing the strong, inducible T5 or T7 bacteriophage promoter may be used.

10 Yeast expression systems may be used for production of GBAP. A number of vectors containing constitutive or inducible promoters, such as alpha factor, alcohol oxidase, and PGH promoters, may be used in the yeast *Saccharomyces cerevisiae* or *Pichia pastoris*. In addition, such vectors direct either the secretion or intracellular retention of expressed proteins and enable integration of foreign sequences into the host genome for stable propagation. (See, e.g., Ausubel, 1995, *supra*;
15 Bitter, *supra*; and Scorer, *supra*.)

Plant systems may also be used for expression of GBAP. Transcription of sequences encoding GBAP may be driven viral promoters, e.g., the 35S and 19S promoters of CaMV used alone or in combination with the omega leader sequence from TMV (Takamatsu, N. (1987) *EMBO J.* 6:307-311). Alternatively, plant promoters such as the small subunit of RUBISCO or heat shock promoters may be
20 used. (See, e.g., Coruzzi, *supra*; Broglie, *supra*; and Winter, *supra*.) These constructs can be introduced into plant cells by direct DNA transformation or pathogen-mediated transfection. (See, e.g., *The McGraw Hill Yearbook of Science and Technology* (1992) McGraw Hill, New York NY, pp. 191-196.)

In mammalian cells, a number of viral-based expression systems may be utilized. In cases
25 where an adenovirus is used as an expression vector, sequences encoding GBAP may be ligated into an adenovirus transcription/translation complex consisting of the late promoter and tripartite leader sequence. Insertion in a non-essential E1 or E3 region of the viral genome may be used to obtain infective virus which expresses GBAP in host cells. (See, e.g., Logan, J. and T. Shenk (1984) *Proc. Natl. Acad. Sci. USA* 81:3655-3659.) In addition, transcription enhancers, such as the Rous sarcoma
30 virus (RSV) enhancer, may be used to increase expression in mammalian host cells. SV40 or EBV-based vectors may also be used for high-level protein expression.

Human artificial chromosomes (HACs) may also be employed to deliver larger fragments of DNA than can be contained in and expressed from a plasmid. HACs of about 6 kb to 10 Mb are constructed and delivered via conventional delivery methods (liposomes, polycationic amino polymers,
35 or vesicles) for therapeutic purposes. (See, e.g., Harrington, J.J. et al. (1997) *Nat. Genet.* 15:345-355.)

For long term production of recombinant proteins in mammalian systems, stable expression of GBAP in cell lines is preferred. For example, sequences encoding GBAP can be transformed into cell lines using expression vectors which may contain viral origins of replication and/or endogenous expression elements and a selectable marker gene on the same or on a separate vector. Following the introduction of the vector, cells may be allowed to grow for about 1 to 2 days in enriched media before being switched to selective media. The purpose of the selectable marker is to confer resistance to a selective agent, and its presence allows growth and recovery of cells which successfully express the introduced sequences. Resistant clones of stably transformed cells may be propagated using tissue culture techniques appropriate to the cell type.

Any number of selection systems may be used to recover transformed cell lines. These include, but are not limited to, the herpes simplex virus thymidine kinase and adenine phosphoribosyltransferase genes, for use in *tk⁻* and *apr⁻* cells, respectively. (See, e.g., Wigler, M. et al. (1977) Cell 11:223-232; Lowy, I. et al. (1980) Cell 22:817-823.) Also, antimetabolite, antibiotic, or herbicide resistance can be used as the basis for selection. For example, *dhfr* confers resistance to methotrexate; *neo* confers resistance to the aminoglycosides neomycin and G-418; and *als* and *pat* confer resistance to chlorsulfuron and phosphinotricin acetyltransferase, respectively. (See, e.g., Wigler, M. et al. (1980) Proc. Natl. Acad. Sci. USA 77:3567-3570; Colbere-Garapin, F. et al. (1981) J. Mol. Biol. 150:1-14.) Additional selectable genes have been described, e.g., *trpB* and *hisD*, which alter cellular requirements for metabolites. (See, e.g., Hartman, S.C. and R.C. Mulligan (1988) Proc. Natl. Acad. Sci. USA 85:8047-8051.) Visible markers, e.g., anthocyanins, green fluorescent proteins (GFP; Clontech), β glucuronidase and its substrate β -glucuronide, or luciferase and its substrate luciferin may be used. These markers can be used not only to identify transformants, but also to quantify the amount of transient or stable protein expression attributable to a specific vector system. (See, e.g., Rhodes, C.A. (1995) Methods Mol. Biol. 55:121-131.)

Although the presence/absence of marker gene expression suggests that the gene of interest is also present, the presence and expression of the gene may need to be confirmed. For example, if the sequence encoding GBAP is inserted within a marker gene sequence, transformed cells containing sequences encoding GBAP can be identified by the absence of marker gene function. Alternatively, a marker gene can be placed in tandem with a sequence encoding GBAP under the control of a single promoter. Expression of the marker gene in response to induction or selection usually indicates expression of the tandem gene as well.

In general, host cells that contain the nucleic acid sequence encoding GBAP and that express GBAP may be identified by a variety of procedures known to those of skill in the art. These procedures include, but are not limited to, DNA-DNA or DNA-RNA hybridizations, PCR amplification, and protein bioassay or immunoassay techniques which include membrane, solution, or chip based

technologies for the detection and/or quantification of nucleic acid or protein sequences.

Immunological methods for detecting and measuring the expression of GBAP using either specific polyclonal or monoclonal antibodies are known in the art. Examples of such techniques include enzyme-linked immunosorbent assays (ELISAs), radioimmunoassays (RIAs), and fluorescence
5 activated cell sorting (FACS). A two-site, monoclonal-based immunoassay utilizing monoclonal antibodies reactive to two non-interfering epitopes on GBAP is preferred, but a competitive binding assay may be employed. These and other assays are well known in the art. (See, e.g., Hampton, R. et al. (1990) Serological Methods, a Laboratory Manual, APS Press, St. Paul MN, Sect. IV; Coligan, J.E. et al. (1997) Current Protocols in Immunology, Greene Pub. Associates and Wiley-Interscience, New
10 York NY; and Pound, J.D. (1998) Immunochemical Protocols, Humana Press, Totowa NJ.)

A wide variety of labels and conjugation techniques are known by those skilled in the art and may be used in various nucleic acid and amino acid assays. Means for producing labeled hybridization or PCR probes for detecting sequences related to polynucleotides encoding GBAP include oligolabeling, nick translation, end-labeling, or PCR amplification using a labeled nucleotide. Alternatively, the
15 sequences encoding GBAP, or any fragments thereof, may be cloned into a vector for the production of an mRNA probe. Such vectors are known in the art, are commercially available, and may be used to synthesize RNA probes *in vitro* by addition of an appropriate RNA polymerase such as T7, T3, or SP6 and labeled nucleotides. These procedures may be conducted using a variety of commercially available kits, such as those provided by Amersham Pharmacia Biotech, Promega (Madison WI), and US
20 Biochemical. Suitable reporter molecules or labels which may be used for ease of detection include radionuclides, enzymes, fluorescent, chemiluminescent, or chromogenic agents, as well as substrates, cofactors, inhibitors, magnetic particles, and the like.

Host cells transformed with nucleotide sequences encoding GBAP may be cultured under conditions suitable for the expression and recovery of the protein from cell culture. The protein
25 produced by a transformed cell may be secreted or retained intracellularly depending on the sequence and/or the vector used. As will be understood by those of skill in the art, expression vectors containing polynucleotides which encode GBAP may be designed to contain signal sequences which direct secretion of GBAP through a prokaryotic or eukaryotic cell membrane.

In addition, a host cell strain may be chosen for its ability to modulate expression of the
30 inserted sequences or to process the expressed protein in the desired fashion. Such modifications of the polypeptide include, but are not limited to, acetylation, carboxylation, glycosylation, phosphorylation, lipidation, and acylation. Post-translational processing which cleaves a "prepro" or "pro" form of the protein may also be used to specify protein targeting, folding, and/or activity. Different host cells which have specific cellular machinery and characteristic mechanisms for post-translational activities
35 (e.g., CHO, HeLa, MDCK, HEK293, and WI38) are available from the American Type Culture

Collection (ATCC, Manassas VA) and may be chosen to ensure the correct modification and processing of the foreign protein.

In another embodiment of the invention, natural, modified, or recombinant nucleic acid sequences encoding GBAP may be ligated to a heterologous sequence resulting in translation of a fusion protein in any of the aforementioned host systems. For example, a chimeric GBAP protein containing a heterologous moiety that can be recognized by a commercially available antibody may facilitate the screening of peptide libraries for inhibitors of GBAP activity. Heterologous protein and peptide moieties may also facilitate purification of fusion proteins using commercially available affinity matrices. Such moieties include, but are not limited to, glutathione S-transferase (GST), maltose binding protein (MBP), thioredoxin (Trx), calmodulin binding peptide (CBP), 6-His, FLAG, *c-myc*, and hemagglutinin (HA). GST, MBP, Trx, CBP, and 6-His enable purification of their cognate fusion proteins on immobilized glutathione, maltose, phenylarsine oxide, calmodulin, and metal-chelate resins, respectively. FLAG, *c-myc*, and hemagglutinin (HA) enable immunoaffinity purification of fusion proteins using commercially available monoclonal and polyclonal antibodies that specifically recognize these epitope tags. A fusion protein may also be engineered to contain a proteolytic cleavage site located between the GBAP encoding sequence and the heterologous protein sequence, so that GBAP may be cleaved away from the heterologous moiety following purification. Methods for fusion protein expression and purification are discussed in Ausubel (1995, supra, ch. 10). A variety of commercially available kits may also be used to facilitate expression and purification of fusion proteins.

In a further embodiment of the invention, synthesis of radiolabeled GBAP may be achieved in vitro using the TNT rabbit reticulocyte lysate or wheat germ extract system (Promega). These systems couple transcription and translation of protein-coding sequences operably associated with the T7, T3, or SP6 promoters. Translation takes place in the presence of a radiolabeled amino acid precursor, for example, ³⁵S-methionine.

GBAP of the present invention or fragments thereof may be used to screen for compounds that specifically bind to GBAP. At least one and up to a plurality of test compounds may be screened for specific binding to GBAP. Examples of test compounds include antibodies, oligonucleotides, proteins (e.g., receptors), or small molecules.

In one embodiment, the compound thus identified is closely related to the natural ligand of GBAP, e.g., a ligand or fragment thereof, a natural substrate, a structural or functional mimetic, or a natural binding partner. (See, Coligan, J.E. et al. (1991) Current Protocols in Immunology 1(2): Chapter 5.) Similarly, the compound can be closely related to the natural receptor to which GBAP binds, or to at least a fragment of the receptor, e.g., the ligand binding site. In either case, the compound can be rationally designed using known techniques. In one embodiment, screening for these compounds involves producing appropriate cells which express GBAP, either as a secreted

protein or on the cell membrane. Preferred cells include cells from mammals, yeast, Drosophila, or E. coli. Cells expressing GBAP or cell membrane fractions which contain GBAP are then contacted with a test compound and binding, stimulation, or inhibition of activity of either GBAP or the compound is analyzed.

- 5 An assay may simply test binding of a test compound to the polypeptide, wherein binding is detected by a fluorophore, radioisotope, enzyme conjugate, or other detectable label. For example, the assay may comprise the steps of combining at least one test compound with GBAP, either in solution or affixed to a solid support, and detecting the binding of GBAP to the compound.
- 10 Alternatively, the assay may detect or measure binding of a test compound in the presence of a labeled competitor. Additionally, the assay may be carried out using cell-free preparations, chemical libraries, or natural product mixtures, and the test compound(s) may be free in solution or affixed to a solid support.

- GBAP of the present invention or fragments thereof may be used to screen for compounds that modulate the activity of GBAP. Such compounds may include agonists, antagonists, or partial or
- 15 inverse agonists. In one embodiment, an assay is performed under conditions permissive for GBAP activity, wherein GBAP is combined with at least one test compound, and the activity of GBAP in the presence of a test compound is compared with the activity of GBAP in the absence of the test compound. A change in the activity of GBAP in the presence of the test compound is indicative of a compound that modulates the activity of GBAP. Alternatively, a test compound is combined with an
- 20 in vitro or cell-free system comprising GBAP under conditions suitable for GBAP activity, and the assay is performed. In either of these assays, a test compound which modulates the activity of GBAP may do so indirectly and need not come in direct contact with the test compound. At least one and up to a plurality of test compounds may be screened.

- In another embodiment, polynucleotides encoding GBAP or their mammalian homologs may
- 25 be "knocked out" in an animal model system using homologous recombination in embryonic stem (ES) cells. Such techniques are well known in the art and are useful for the generation of animal models of human disease. (See, e.g., U.S. Patent No. 5,175,383 and U.S. Patent No. 5,767,337.) For example, mouse ES cells, such as the mouse 129/SvJ cell line, are derived from the early mouse embryo and grown in culture. The ES cells are transformed with a vector containing the gene of
- 30 interest disrupted by a marker gene, e.g., the neomycin phosphotransferase gene (neo; Capecchi, M.R. (1989) Science 244:1288-1292). The vector integrates into the corresponding region of the host genome by homologous recombination. Alternatively, homologous recombination takes place using the Cre-loxP system to knockout a gene of interest in a tissue- or developmental stage-specific manner (Marth, J.D. (1996) Clin. Invest. 97:1999-2002; Wagner, K.U. et al. (1997) Nucleic Acids
- 35 Res. 25:4323-4330). Transformed ES cells are identified and microinjected into mouse cell blastocysts such as those from the C57BL/6 mouse strain. The blastocysts are surgically transferred

to pseudopregnant dams, and the resulting chimeric progeny are genotyped and bred to produce heterozygous or homozygous strains. Transgenic animals thus generated may be tested with potential therapeutic or toxic agents.

Polynucleotides encoding GBAP may also be manipulated in vitro in ES cells derived from
5 human blastocysts. Human ES cells have the potential to differentiate into at least eight separate cell lineages including endoderm, mesoderm, and ectodermal cell types. These cell lineages differentiate into, for example, neural cells, hematopoietic lineages, and cardiomyocytes (Thomson, J.A. et al. (1998) Science 282:1145-1147).

Polynucleotides encoding GBAP can also be used to create "knockin" humanized animals
10 (pigs) or transgenic animals (mice or rats) to model human disease. With knockin technology, a region of a polynucleotide encoding GBAP is injected into animal ES cells, and the injected sequence integrates into the animal cell genome. Transformed cells are injected into blastulae, and the blastulae are implanted as described above. Transgenic progeny or inbred lines are studied and treated with potential pharmaceutical agents to obtain information on treatment of a human disease.
15 Alternatively, a mammal inbred to overexpress GBAP, e.g., by secreting GBAP in its milk, may also serve as a convenient source of that protein (Janne, J. et al. (1998) Biotechnol. Annu. Rev. 4:55-74).

THERAPEUTICS

Chemical and structural similarity, e.g., in the context of sequences and motifs, exists between regions of GBAP and GTP-binding associated proteins. In addition, the expression of GBAP
20 is closely associated with reproductive tissues, inflammation and the immune response, trauma, cell proliferation, and cancer. Therefore, GBAP appears to play a role in immune system, reproductive, nervous system, and cell signaling disorders, and cell proliferative disorders including cancer. In the treatment of disorders associated with increased GBAP expression or activity, it is desirable to decrease the expression or activity of GBAP. In the treatment of disorders associated with decreased
25 GBAP expression or activity, it is desirable to increase the expression or activity of GBAP.

Therefore, in one embodiment, GBAP or a fragment or derivative thereof may be administered to a subject to treat or prevent a disorder associated with decreased expression or activity of GBAP. Examples of such disorders include, but are not limited to, an immune system disorder such as inflammation, actinic keratosis, acquired immunodeficiency syndrome (AIDS),
30 Addison's disease, adult respiratory distress syndrome, allergies, ankylosing spondylitis, amyloidosis, anemia, arteriosclerosis, asthma, atherosclerosis, autoimmune hemolytic anemia, autoimmune thyroiditis, bronchitis, bursitis, cholecystitis, cirrhosis, contact dermatitis, Crohn's disease, atopic dermatitis, dermatomyositis, diabetes mellitus, emphysema, erythroblastosis fetalis, erythema nodosum, atrophic gastritis, glomerulonephritis, Goodpasture's syndrome, gout, Graves' disease,
35 Hashimoto's thyroiditis, paroxysmal nocturnal hemoglobinuria, hepatitis, hypereosinophilia, irritable

bowel syndrome, episodic lymphopenia with lymphocytotoxins, mixed connective tissue disease (MCTD), multiple sclerosis, myasthenia gravis, myocardial or pericardial inflammation, myelofibrosis, osteoarthritis, osteoporosis, pancreatitis, polycythemia vera, polymyositis, psoriasis, Reiter's syndrome, rheumatoid arthritis, scleroderma, Sjögren's syndrome, systemic anaphylaxis,

5 systemic lupus erythematosus, systemic sclerosis, primary thrombocythemia, thrombocytopenic purpura, ulcerative colitis, uveitis, Werner syndrome, complications of cancer, hemodialysis, and extracorporeal circulation, trauma, and hematopoietic cancer including lymphoma, leukemia, and myeloma; a reproductive disorder such as a disorder of prolactin production, infertility, including tubal disease, ovulatory defects, and endometriosis, a disruption of the estrous cycle, a disruption of

10 the menstrual cycle, polycystic ovary syndrome, ovarian hyperstimulation syndrome, an endometrial or ovarian tumor, a uterine fibroid, autoimmune disorders, an ectopic pregnancy, and teratogenesis, cancer of the breast, fibrocystic breast disease, and galactorrhea, a disruption of spermatogenesis, abnormal sperm physiology, cancer of the testis, cancer of the prostate, benign prostatic hyperplasia, prostatitis, Peyronie's disease, impotence, carcinoma of the male breast, and gynecomastia; a nervous

15 system disorder such as epilepsy, ischemic cerebrovascular disease, stroke, cerebral neoplasms, Alzheimer's disease, Pick's disease, Huntington's disease, dementia, Parkinson's disease and other extrapyramidal disorders, amyotrophic lateral sclerosis and other motor neuron disorders, progressive neural muscular atrophy, retinitis pigmentosa, hereditary ataxias, multiple sclerosis and other demyelinating diseases, bacterial and viral meningitis, brain abscess, subdural empyema, epidural

20 abscess, suppurative intracranial thrombophlebitis, myelitis and radiculitis, viral central nervous system disease, prion diseases including kuru, Creutzfeldt-Jakob disease, and Gerstmann-Straussler-Scheinker syndrome, fatal familial insomnia, nutritional and metabolic diseases of the nervous system, neurofibromatosis, tuberous sclerosis, cerebelloretinal hemangioblastomatosis, encephalotrigeminal syndrome, mental retardation and other developmental disorders of the central

25 nervous system, cerebral palsy, neuroskeletal disorders, autonomic nervous system disorders, cranial nerve disorders, spinal cord diseases, muscular dystrophy and other neuromuscular disorders, peripheral nervous system disorders, dermatomyositis and polymyositis, inherited, metabolic, endocrine, and toxic myopathies, myasthenia gravis, periodic paralysis, mental disorders including mood, anxiety, and schizophrenic disorders, akathisia, amnesia, catatonia, diabetic neuropathy,

30 tardive dyskinesia, dystonias, paranoid psychoses, postherpetic neuralgia, and Tourette's disorder; a cell signaling disorder including endocrine disorders such as disorders of the hypothalamus and pituitary resulting from lesions such as primary brain tumors, adenomas, infarction associated with pregnancy, hypophysectomy, aneurysms, vascular malformations, thrombosis, infections, immunological disorders, and complications due to head trauma; disorders associated with

35 hyperpituitarism including acromegaly, gigantism, and syndrome of inappropriate antidiuretic hormone (ADH) secretion (SIADH) often caused by benign adenoma; disorders associated with

hypothyroidism including goiter, myxedema, acute thyroiditis associated with bacterial infection; disorders associated with hyperparathyroidism including Conn disease (chronic hypercalcemia); pancreatic disorders such as Type I or Type II diabetes mellitus and associated complications; disorders associated with the adrenals such as hyperplasia, carcinoma, or adenoma of the adrenal
5 cortex, hypertension associated with alkalosis; disorders associated with gonadal steroid hormones such as: in women, abnormal prolactin production, infertility, endometriosis, perturbations of the menstrual cycle, polycystic ovarian disease, hyperprolactinemia, isolated gonadotropin deficiency, amenorrhea, galactorrhea, hermaphroditism, hirsutism and virilization, breast cancer, and, in post-menopausal women, osteoporosis; and, in men, Leydig cell deficiency, male climacteric phase, and
10 germinal cell aplasia, hypergonadal disorders associated with Leydig cell tumors, androgen resistance associated with absence of androgen receptors, syndrome of 5 α -reductase, and gynecomastia; and a cell proliferative disorder such as actinic keratosis, arteriosclerosis, atherosclerosis, bursitis, cirrhosis, hepatitis, mixed connective tissue disease (MCTD), myelofibrosis, paroxysmal nocturnal hemoglobinuria, polycythemia vera, psoriasis, primary thrombocythemia, and cancers including
15 adenocarcinoma, leukemia, lymphoma, melanoma, myeloma, sarcoma, teratocarcinoma, and, in particular, cancers of the adrenal gland, bladder, bone, bone marrow, brain, breast, cervix, gall bladder, ganglia, gastrointestinal tract, heart, kidney, liver, lung, muscle, ovary, pancreas, parathyroid, penis, prostate, salivary glands, skin, spleen, testis, thymus, thyroid, and uterus.

In another embodiment, a vector capable of expressing GBAP or a fragment or derivative
20 thereof may be administered to a subject to treat or prevent a disorder associated with decreased expression or activity of GBAP including, but not limited to, those described above.

In a further embodiment, a pharmaceutical composition comprising a substantially purified GBAP in conjunction with a suitable pharmaceutical carrier may be administered to a subject to treat or prevent a disorder associated with decreased expression or activity of GBAP including, but not limited
25 to, those provided above.

In still another embodiment, an agonist which modulates the activity of GBAP may be administered to a subject to treat or prevent a disorder associated with decreased expression or activity of GBAP including, but not limited to, those listed above.

In a further embodiment, an antagonist of GBAP may be administered to a subject to treat or
30 prevent a disorder associated with increased expression or activity of GBAP. Examples of such disorders include, but are not limited to, those immune system, reproductive, nervous system, and cell signaling disorders, and cell proliferative disorders including cancer, described above. In one aspect, an antibody which specifically binds GBAP may be used directly as an antagonist or indirectly as a targeting or delivery mechanism for bringing a pharmaceutical agent to cells or tissues which express
35 GBAP.

In an additional embodiment, a vector expressing the complement of the polynucleotide encoding GBAP may be administered to a subject to treat or prevent a disorder associated with increased expression or activity of GBAP including, but not limited to, those described above.

In other embodiments, any of the proteins, antagonists, antibodies, agonists, complementary sequences, or vectors of the invention may be administered in combination with other appropriate therapeutic agents. Selection of the appropriate agents for use in combination therapy may be made by one of ordinary skill in the art, according to conventional pharmaceutical principles. The combination of therapeutic agents may act synergistically to effect the treatment or prevention of the various disorders described above. Using this approach, one may be able to achieve therapeutic efficacy with lower dosages of each agent, thus reducing the potential for adverse side effects.

An antagonist of GBAP may be produced using methods which are generally known in the art. In particular, purified GBAP may be used to produce antibodies or to screen libraries of pharmaceutical agents to identify those which specifically bind GBAP. Antibodies to GBAP may also be generated using methods that are well known in the art. Such antibodies may include, but are not limited to, polyclonal, monoclonal, chimeric, and single chain antibodies, Fab fragments, and fragments produced by a Fab expression library. Neutralizing antibodies (i.e., those which inhibit dimer formation) are generally preferred for therapeutic use.

For the production of antibodies, various hosts including goats, rabbits, rats, mice, humans, and others may be immunized by injection with GBAP or with any fragment or oligopeptide thereof which has immunogenic properties. Depending on the host species, various adjuvants may be used to increase immunological response. Such adjuvants include, but are not limited to, Freund's, mineral gels such as aluminum hydroxide, and surface active substances such as lysolecithin, pluronic polyols, polyanions, peptides, oil emulsions, KLH, and dinitrophenol. Among adjuvants used in humans, BCG (bacilli Calmette-Guerin) and Corynebacterium parvum are especially preferable.

It is preferred that the oligopeptides, peptides, or fragments used to induce antibodies to GBAP have an amino acid sequence consisting of at least about 5 amino acids, and generally will consist of at least about 10 amino acids. It is also preferable that these oligopeptides, peptides, or fragments are identical to a portion of the amino acid sequence of the natural protein. Short stretches of GBAP amino acids may be fused with those of another protein, such as KLH, and antibodies to the chimeric molecule may be produced.

Monoclonal antibodies to GBAP may be prepared using any technique which provides for the production of antibody molecules by continuous cell lines in culture. These include, but are not limited to, the hybridoma technique, the human B-cell hybridoma technique, and the EBV-hybridoma technique. (See, e.g., Kohler, G. et al. (1975) Nature 256:495-497; Kozbor, D. et al. (1985) J. Immunol. Methods 81:31-42; Cote, R.J. et al. (1983) Proc. Natl. Acad. Sci. USA 80:2026-2030; and

Cole, S.P. et al. (1984) Mol. Cell Biol. 62:109-120.)

In addition, techniques developed for the production of "chimeric antibodies," such as the splicing of mouse antibody genes to human antibody genes to obtain a molecule with appropriate antigen specificity and biological activity, can be used. (See, e.g., Morrison, S.L. et al. (1984) Proc. Natl. Acad. Sci. USA 81:6851-6855; Neuberger, M.S. et al. (1984) Nature 312:604-608; and Takeda, S. et al. (1985) Nature 314:452-454.) Alternatively, techniques described for the production of single chain antibodies may be adapted, using methods known in the art, to produce GBAP-specific single chain antibodies. Antibodies with related specificity, but of distinct idiotypic composition, may be generated by chain shuffling from random combinatorial immunoglobulin libraries. (See, e.g., Burton, D.R. (1991) Proc. Natl. Acad. Sci. USA 88:10134-10137.)

Antibodies may also be produced by inducing *in vivo* production in the lymphocyte population or by screening immunoglobulin libraries or panels of highly specific binding reagents as disclosed in the literature. (See, e.g., Orlandi, R. et al. (1989) Proc. Natl. Acad. Sci. USA 86:3833-3837; Winter, G. et al. (1991) Nature 349:293-299.)

Antibody fragments which contain specific binding sites for GBAP may also be generated. For example, such fragments include, but are not limited to, $F(ab')_2$ fragments produced by pepsin digestion of the antibody molecule and Fab fragments generated by reducing the disulfide bridges of the $F(ab')_2$ fragments. Alternatively, Fab expression libraries may be constructed to allow rapid and easy identification of monoclonal Fab fragments with the desired specificity. (See, e.g., Huse, W.D. et al. (1989) Science 246:1275-1281.)

Various immunoassays may be used for screening to identify antibodies having the desired specificity. Numerous protocols for competitive binding or immunoradiometric assays using either polyclonal or monoclonal antibodies with established specificities are well known in the art. Such immunoassays typically involve the measurement of complex formation between GBAP and its specific antibody. A two-site, monoclonal-based immunoassay utilizing monoclonal antibodies reactive to two non-interfering GBAP epitopes is generally used, but a competitive binding assay may also be employed (Pound, *supra*).

Various methods such as Scatchard analysis in conjunction with radioimmunoassay techniques may be used to assess the affinity of antibodies for GBAP. Affinity is expressed as an association constant, K_a , which is defined as the molar concentration of GBAP-antibody complex divided by the molar concentrations of free antigen and free antibody under equilibrium conditions. The K_a determined for a preparation of polyclonal antibodies, which are heterogeneous in their affinities for multiple GBAP epitopes, represents the average affinity, or avidity, of the antibodies for GBAP. The K_a determined for a preparation of monoclonal antibodies, which are monospecific for a particular GBAP epitope, represents a true measure of affinity. High-affinity antibody preparations with K_a ranging from

about 10^9 to 10^{12} L/mole are preferred for use in immunoassays in which the GBAP-antibody complex must withstand rigorous manipulations. Low-affinity antibody preparations with K_d ranging from about 10^6 to 10^7 L/mole are preferred for use in immunopurification and similar procedures which ultimately require dissociation of GBAP, preferably in active form, from the antibody (Catty, D. (1988)

- 5 Antibodies, Volume I: A Practical Approach, IRL Press, Washington DC; Liddell, J.E. and A. Cryer (1991) A Practical Guide to Monoclonal Antibodies, John Wiley & Sons, New York NY).

The titer and avidity of polyclonal antibody preparations may be further evaluated to determine the quality and suitability of such preparations for certain downstream applications. For example, a polyclonal antibody preparation containing at least 1-2 mg specific antibody/ml, preferably 5-10 mg
10 specific antibody/ml, is generally employed in procedures requiring precipitation of GBAP-antibody complexes. Procedures for evaluating antibody specificity, titer, and avidity, and guidelines for antibody quality and usage in various applications, are generally available. (See, e.g., Catty, supra, and Coligan et al., supra.)

In another embodiment of the invention, the polynucleotides encoding GBAP, or any fragment
15 or complement thereof, may be used for therapeutic purposes. In one aspect, modifications of gene expression can be achieved by designing complementary sequences or antisense molecules (DNA, RNA, PNA, or modified oligonucleotides) to the coding or regulatory regions of the gene encoding GBAP. Such technology is well known in the art, and antisense oligonucleotides or larger fragments can be designed from various locations along the coding or control regions of sequences encoding GBAP.
20 (See, e.g., Agrawal, S., ed. (1996) Antisense Therapeutics, Humana Press Inc., Totawa NJ.)

In therapeutic use, any gene delivery system suitable for introduction of the antisense sequences into appropriate target cells can be used. Antisense sequences can be delivered intracellularly in the form of an expression plasmid which, upon transcription, produces a sequence complementary to at least a portion of the cellular sequence encoding the target protein. (See, e.g.,
25 Slater, J.E. et al. (1998) J. Allergy Clin. Immunol. 102(3):469-475; and Scanlon, K.J. et al. (1995) 9(13):1288-1296.) Antisense sequences can also be introduced intracellularly through the use of viral vectors, such as retrovirus and adeno-associated virus vectors. (See, e.g., Miller, A.D. (1990) Blood 76:271; Ausubel, supra; Uckert, W. and W. Walther (1994) Pharmacol. Ther. 63(3):323-347.) Other gene delivery mechanisms include liposome-derived systems, artificial viral envelopes, and other
30 systems known in the art. (See, e.g., Rossi, J.J. (1995) Br. Med. Bull. 51(1):217-225; Boado, R.J. et al. (1998) J. Pharm. Sci. 87(11):1308-1315; and Morris, M.C. et al. (1997) Nucleic Acids Res. 25(14):2730-2736.)

In another embodiment of the invention, polynucleotides encoding GBAP may be used for somatic or germline gene therapy. Gene therapy may be performed to (i) correct a genetic deficiency
35 (e.g., in the cases of severe combined immunodeficiency (SCID)-X1 disease characterized by X-linked

inheritance (Cavazzana-Calvo, M. et al. (2000) Science 288:669-672), severe combined immunodeficiency syndrome associated with an inherited adenosine deaminase (ADA) deficiency (Blaese, R.M. et al. (1995) Science 270:475-480; Bordignon, C. et al. (1995) Science 270:470-475), cystic fibrosis (Zabner, J. et al. (1993) Cell 75:207-216; Crystal, R.G. et al. (1995) Hum. Gene Therapy 6:643-666; Crystal, R.G. et al. (1995) Hum. Gene Therapy 6:667-703), thalassemias, familial hypercholesterolemia, and hemophilia resulting from Factor VIII or Factor IX deficiencies (Crystal, R.G. (1995) Science 270:404-410; Verma, I.M. and Somia, N. (1997) Nature 389:239-242)), (ii) express a conditionally lethal gene product (e.g., in the case of cancers which result from unregulated cell proliferation), or (iii) express a protein which affords protection against intracellular parasites (e.g., against human retroviruses, such as human immunodeficiency virus (HIV) (Baltimore, D. (1988) Nature 335:395-396; Poeschla, E. et al. (1996) Proc. Natl. Acad. Sci. USA. 93:11395-11399), hepatitis B or C virus (HBV, HCV); fungal parasites, such as Candida albicans and Paracoccidioides brasiliensis; and protozoan parasites such as Plasmodium falciparum and Trypanosoma cruzi). In the case where a genetic deficiency in GBAP expression or regulation causes disease, the expression of GBAP from an appropriate population of transduced cells may alleviate the clinical manifestations caused by the genetic deficiency.

In a further embodiment of the invention, diseases or disorders caused by deficiencies in GBAP are treated by constructing mammalian expression vectors encoding GBAP and introducing these vectors by mechanical means into GBAP-deficient cells. Mechanical transfer technologies for use with cells in vivo or ex vitro include (i) direct DNA microinjection into individual cells, (ii) ballistic gold particle delivery, (iii) liposome-mediated transfection, (iv) receptor-mediated gene transfer, and (v) the use of DNA transposons (Morgan, R.A. and W.F. Anderson (1993) Annu. Rev. Biochem. 62:191-217; Ivics, Z. (1997) Cell 91:501-510; Boulay, J-L. and H. Récipon (1998) Curr. Opin. Biotechnol. 9:445-450).

Expression vectors that may be effective for the expression of GBAP include, but are not limited to, the PCDNA 3.1, EPITAG, PRCCMV2, PREP, PVAX vectors (Invitrogen, Carlsbad CA), PCMV-SCRIPT, PCMV-TAG, PEGSH/PERV (Stratagene, La Jolla CA), and PTET-OFF, PTET-ON, PTRE2, PTRE2-LUC, PTK-HYG (Clontech, Palo Alto CA). GBAP may be expressed using (i) a constitutively active promoter, (e.g., from cytomegalovirus (CMV), Rous sarcoma virus (RSV), SV40 virus, thymidine kinase (TK), or β -actin genes), (ii) an inducible promoter (e.g., the tetracycline-regulated promoter (Gossen, M. and H. Bujard (1992) Proc. Natl. Acad. Sci. USA 89:5547-5551; Gossen, M. et al. (1995) Science 268:1766-1769; Rossi, F.M.V. and H.M. Blau (1998) Curr. Opin. Biotechnol. 9:451-456), commercially available in the T-REX plasmid (Invitrogen)); the ecdysone-inducible promoter (available in the plasmids PVGRXR and PIND; Invitrogen); the FK506/rapamycin inducible promoter; or the RU486/mifepristone inducible promoter (Rossi, F.M.V.

and H.M. Blau, supra)), or (iii) a tissue-specific promoter or the native promoter of the endogenous gene encoding GBAP from a normal individual.

Commercially available liposome transformation kits (e.g., the PERFECT LIPID TRANSFECTION KIT, available from Invitrogen) allow one with ordinary skill in the art to deliver
5 polynucleotides to target cells in culture and require minimal effort to optimize experimental parameters. In the alternative, transformation is performed using the calcium phosphate method (Graham, F.L. and A.J. Eb (1973) *Virology* 52:456-467), or by electroporation (Neumann, E. et al. (1982) *EMBO J.* 1:841-845). The introduction of DNA to primary cells requires modification of these standardized mammalian transfection protocols.

10 In another embodiment of the invention, diseases or disorders caused by genetic defects with respect to GBAP expression are treated by constructing a retrovirus vector consisting of (i) the polynucleotide encoding GBAP under the control of an independent promoter or the retrovirus long terminal repeat (LTR) promoter, (ii) appropriate RNA packaging signals, and (iii) a Rev-responsive element (RRE) along with additional retrovirus *cis*-acting RNA sequences and coding sequences
15 required for efficient vector propagation. Retrovirus vectors (e.g., PFB and PFBNEO) are commercially available (Stratagene) and are based on published data (Riviere, I. et al. (1995) *Proc. Natl. Acad. Sci. USA* 92:6733-6737), incorporated by reference herein. The vector is propagated in an appropriate vector producing cell line (VPCL) that expresses an envelope gene with a tropism for receptors on the target cells or a promiscuous envelope protein such as VSVg (Armentano, D. et al.
20 (1987) *J. Virol.* 61:1647-1650; Bender, M.A. et al. (1987) *J. Virol.* 61:1639-1646; Adam, M.A. and A.D. Miller (1988) *J. Virol.* 62:3802-3806; Dull, T. et al. (1998) *J. Virol.* 72:8463-8471; Zufferey, R. et al. (1998) *J. Virol.* 72:9873-9880). U.S. Patent Number 5,910,434 to Rigg ("Method for obtaining retrovirus packaging cell lines producing high transducing efficiency retroviral supernatant") discloses a method for obtaining retrovirus packaging cell lines and is hereby incorporated by reference.

25 Propagation of retrovirus vectors, transduction of a population of cells (e.g., CD4⁺ T-cells), and the return of transduced cells to a patient are procedures well known to persons skilled in the art of gene therapy and have been well documented (Ranga, U. et al. (1997) *J. Virol.* 71:7020-7029; Bauer, G. et al. (1997) *Blood* 89:2259-2267; Bonyhadi, M.L. (1997) *J. Virol.* 71:4707-4716; Ranga, U. et al. (1998) *Proc. Natl. Acad. Sci. USA* 95:1201-1206; Su, L. (1997) *Blood* 89:2283-2290).

30 In the alternative, an adenovirus-based gene therapy delivery system is used to deliver polynucleotides encoding GBAP to cells which have one or more genetic abnormalities with respect to the expression of GBAP. The construction and packaging of adenovirus-based vectors are well known to those with ordinary skill in the art. Replication defective adenovirus vectors have proven to be versatile for importing genes encoding immunoregulatory proteins into intact islets in the pancreas
35 (Csete, M.E. et al. (1995) *Transplantation* 27:263-268). Potentially useful adenoviral vectors are

described in U.S. Patent Number 5,707,618 to Armentano ("Adenovirus vectors for gene therapy"), hereby incorporated by reference. For adenoviral vectors, see also Antinozzi, P.A. et al. (1999) *Annu. Rev. Nutr.* 19:511-544; and Verma, I.M. and N. Somia (1997) *Nature* 18:389:239-242, both incorporated by reference herein.

5 In another alternative, a herpes-based, gene therapy delivery system is used to deliver polynucleotides encoding GBAP to target cells which have one or more genetic abnormalities with respect to the expression of GBAP. The use of herpes simplex virus (HSV)-based vectors may be especially valuable for introducing GBAP to cells of the central nervous system, for which HSV has a tropism. The construction and packaging of herpes-based vectors are well known to those with
10 ordinary skill in the art. A replication-competent herpes simplex virus (HSV) type 1-based vector has been used to deliver a reporter gene to the eyes of primates (Liu, X. et al. (1999) *Exp. Eye Res.* 169:385-395). The construction of a HSV-1 virus vector has also been disclosed in detail in U.S. Patent Number 5,804,413 to DeLuca ("Herpes simplex virus strains for gene transfer"), which is hereby incorporated by reference. U.S. Patent Number 5,804,413 teaches the use of recombinant HSV
15 d92 which consists of a genome containing at least one exogenous gene to be transferred to a cell under the control of the appropriate promoter for purposes including human gene therapy. Also taught by this patent are the construction and use of recombinant HSV strains deleted for ICP4, ICP27 and ICP22. For HSV vectors, see also Goins, W.F. et al. (1999) *J. Virol.* 73:519-532 and Xu, H. et al. (1994) *Dev. Biol.* 163:152-161, hereby incorporated by reference. The manipulation of cloned herpesvirus
20 sequences, the generation of recombinant virus following the transfection of multiple plasmids containing different segments of the large herpesvirus genomes, the growth and propagation of herpesvirus, and the infection of cells with herpesvirus are techniques well known to those of ordinary skill in the art.

In another alternative, an alphavirus (positive, single-stranded RNA virus) vector is used to
25 deliver polynucleotides encoding GBAP to target cells. The biology of the prototypic alphavirus, Semliki Forest Virus (SFV), has been studied extensively and gene transfer vectors have been based on the SFV genome (Garoff, H. and K.-J. Li (1998) *Curr. Opin. Biotech.* 9:464-469). During alphavirus RNA replication, a subgenomic RNA is generated that normally encodes the viral capsid proteins. This subgenomic RNA replicates to higher levels than the full-length genomic RNA, resulting in the
30 overproduction of capsid proteins relative to the viral proteins with enzymatic activity (e.g., protease and polymerase). Similarly, inserting the coding sequence for GBAP into the alphavirus genome in place of the capsid-coding region results in the production of a large number of GBAP-coding RNAs and the synthesis of high levels of GBAP in vector transduced cells. While alphavirus infection is typically associated with cell lysis within a few days, the ability to establish a persistent infection in
35 hamster normal kidney cells (BHK-21) with a variant of Sindbis virus (SIN) indicates that the lytic

replication of alphaviruses can be altered to suit the needs of the gene therapy application (Dryga, S.A. et al. (1997) Virology 228:74-83). The wide host range of alphaviruses will allow the introduction of GBAP into a variety of cell types. The specific transduction of a subset of cells in a population may require the sorting of cells prior to transduction. The methods of manipulating infectious cDNA clones of alphaviruses, performing alphavirus cDNA and RNA transfections, and performing alphavirus infections, are well known to those with ordinary skill in the art.

Oligonucleotides derived from the transcription initiation site, e.g., between about positions -10 and +10 from the start site, may also be employed to inhibit gene expression. Similarly, inhibition can be achieved using triple helix base-pairing methodology. Triple helix pairing is useful because it causes inhibition of the ability of the double helix to open sufficiently for the binding of polymerases, transcription factors, or regulatory molecules. Recent therapeutic advances using triplex DNA have been described in the literature. (See, e.g., Gee, J.E. et al. (1994) in Huber, B.E. and B.I. Carr, Molecular and Immunologic Approaches, Futura Publishing, Mt. Kisco NY, pp. 163-177.) A complementary sequence or antisense molecule may also be designed to block translation of mRNA by preventing the transcript from binding to ribosomes.

Ribozymes, enzymatic RNA molecules, may also be used to catalyze the specific cleavage of RNA. The mechanism of ribozyme action involves sequence-specific hybridization of the ribozyme molecule to complementary target RNA, followed by endonucleolytic cleavage. For example, engineered hammerhead motif ribozyme molecules may specifically and efficiently catalyze endonucleolytic cleavage of sequences encoding GBAP.

Specific ribozyme cleavage sites within any potential RNA target are initially identified by scanning the target molecule for ribozyme cleavage sites, including the following sequences: GUA, GUU, and GUC. Once identified, short RNA sequences of between 15 and 20 ribonucleotides, corresponding to the region of the target gene containing the cleavage site, may be evaluated for secondary structural features which may render the oligonucleotide inoperable. The suitability of candidate targets may also be evaluated by testing accessibility to hybridization with complementary oligonucleotides using ribonuclease protection assays.

Complementary ribonucleic acid molecules and ribozymes of the invention may be prepared by any method known in the art for the synthesis of nucleic acid molecules. These include techniques for chemically synthesizing oligonucleotides such as solid phase phosphoramidite chemical synthesis. Alternatively, RNA molecules may be generated by in vitro and in vivo transcription of DNA sequences encoding GBAP. Such DNA sequences may be incorporated into a wide variety of vectors with suitable RNA polymerase promoters such as T7 or SP6. Alternatively, these cDNA constructs that synthesize complementary RNA, constitutively or inducibly, can be introduced into cell lines, cells, or tissues.

RNA molecules may be modified to increase intracellular stability and half-life. Possible modifications include, but are not limited to, the addition of flanking sequences at the 5' and/or 3' ends of the molecule, or the use of phosphorothioate or 2' O-methyl rather than phosphodiesterase linkages within the backbone of the molecule. This concept is inherent in the production of PNAs and can be
5 extended in all of these molecules by the inclusion of nontraditional bases such as inosine, queosine, and wybutosine, as well as acetyl-, methyl-, thio-, and similarly modified forms of adenine, cytidine, guanine, thymine, and uridine which are not as easily recognized by endogenous endonucleases.

An additional embodiment of the invention encompasses a method for screening for a compound which is effective in altering expression of a polynucleotide encoding GBAP. Compounds
10 which may be effective in altering expression of a specific polynucleotide may include, but are not limited to, oligonucleotides, antisense oligonucleotides, triple helix-forming oligonucleotides, transcription factors and other polypeptide transcriptional regulators, and non-macromolecular chemical entities which are capable of interacting with specific polynucleotide sequences. Effective compounds may alter polynucleotide expression by acting as either inhibitors or promoters of
15 polynucleotide expression. Thus, in the treatment of disorders associated with increased GBAP expression or activity, a compound which specifically inhibits expression of the polynucleotide encoding GBAP may be therapeutically useful, and in the treatment of disorders associated with decreased GBAP expression or activity, a compound which specifically promotes expression of the polynucleotide encoding GBAP may be therapeutically useful.

20 At least one, and up to a plurality, of test compounds may be screened for effectiveness in altering expression of a specific polynucleotide. A test compound may be obtained by any method commonly known in the art, including chemical modification of a compound known to be effective in altering polynucleotide expression; selection from an existing, commercially-available or proprietary library of naturally-occurring or non-natural chemical compounds; rational design of a compound
25 based on chemical and/or structural properties of the target polynucleotide; and selection from a library of chemical compounds created combinatorially or randomly. A sample comprising a polynucleotide encoding GBAP is exposed to at least one test compound thus obtained. The sample may comprise, for example, an intact or permeabilized cell, or an *in vitro* cell-free or reconstituted biochemical system. Alterations in the expression of a polynucleotide encoding GBAP are assayed
30 by any method commonly known in the art. Typically, the expression of a specific nucleotide is detected by hybridization with a probe having a nucleotide sequence complementary to the sequence of the polynucleotide encoding GBAP. The amount of hybridization may be quantified, thus forming the basis for a comparison of the expression of the polynucleotide both with and without exposure to one or more test compounds. Detection of a change in the expression of a polynucleotide
35 exposed to a test compound indicates that the test compound is effective in altering the expression of

the polynucleotide. A screen for a compound effective in altering expression of a specific polynucleotide can be carried out, for example, using a Schizosaccharomyces pombe gene expression system (Atkins, D. et al. (1999) U.S. Patent No. 5,932,435; Arndt, G.M. et al. (2000) Nucleic Acids Res. 28:E15) or a human cell line such as HeLa cell (Clarke, M.L. et al. (2000) Biochem. Biophys.

5 Res. Commun. 268:8-13). A particular embodiment of the present invention involves screening a combinatorial library of oligonucleotides (such as deoxyribonucleotides, ribonucleotides, peptide nucleic acids, and modified oligonucleotides) for antisense activity against a specific polynucleotide sequence (Bruice, T.W. et al. (1997) U.S. Patent No. 5,686,242; Bruice, T.W. et al. (2000) U.S. Patent No. 6,022,691).

10 Many methods for introducing vectors into cells or tissues are available and equally suitable for use in vivo, in vitro, and ex vivo. For ex vivo therapy, vectors may be introduced into stem cells taken from the patient and clonally propagated for autologous transplant back into that same patient. Delivery by transfection, by liposome injections, or by polycationic amino polymers may be achieved using methods which are well known in the art. (See, e.g., Goldman, C.K. et al. (1997) Nat.

15 Biotechnol. 15:462-466.)

Any of the therapeutic methods described above may be applied to any subject in need of such therapy, including, for example, mammals such as humans, dogs, cats, cows, horses, rabbits, and monkeys.

An additional embodiment of the invention relates to the administration of a pharmaceutical
20 composition which generally comprises an active ingredient formulated with a pharmaceutically acceptable excipient. Excipients may include, for example, sugars, starches, celluloses, gums, and proteins. Various formulations are commonly known and are thoroughly discussed in the latest edition of Remington's Pharmaceutical Sciences (Maack Publishing, Easton PA). Such pharmaceutical compositions may consist of GBAP, antibodies to GBAP, and mimetics, agonists, antagonists, or
25 inhibitors of GBAP.

The pharmaceutical compositions utilized in this invention may be administered by any number of routes including, but not limited to, oral, intravenous, intramuscular, intra-arterial, intramedullary, intrathecal, intraventricular, pulmonary, transdermal, subcutaneous, intraperitoneal, intranasal, enteral, topical, sublingual, or rectal means.

30 Pharmaceutical compositions for pulmonary administration may be prepared in liquid or dry powder form. These compositions are generally aerosolized immediately prior to inhalation by the patient. In the case of small molecules (e.g. traditional low molecular weight organic drugs), aerosol delivery of fast-acting formulations is well-known in the art. In the case of macromolecules (e.g. larger peptides and proteins), recent developments in the field of pulmonary delivery via the alveolar region of
35 the lung have enabled the practical delivery of drugs such as insulin to blood circulation (see, e.g.,

Patton, J.S. et al., U.S. Patent No. 5,997,848). Pulmonary delivery has the advantage of administration without needle injection, and obviates the need for potentially toxic penetration enhancers.

Pharmaceutical compositions suitable for use in the invention include compositions wherein the active ingredients are contained in an effective amount to achieve the intended purpose. The
5 determination of an effective dose is well within the capability of those skilled in the art.

Specialized forms of pharmaceutical compositions may be prepared for direct intracellular delivery of macromolecules comprising GBAP or fragments thereof. For example, liposome preparations containing a cell-impermeable macromolecule may promote cell fusion and intracellular delivery of the macromolecule. Alternatively, GBAP or a fragment thereof may be joined to a short
10 cationic N-terminal portion from the HIV Tat-1 protein. Fusion proteins thus generated have been found to transduce into the cells of all tissues, including the brain, in a mouse model system (Schwarze, S.R. et al. (1999) Science 285:1569-1572).

For any compound, the therapeutically effective dose can be estimated initially either in cell culture assays, e.g., of neoplastic cells, or in animal models such as mice, rats, rabbits, dogs, monkeys,
15 or pigs. An animal model may also be used to determine the appropriate concentration range and route of administration. Such information can then be used to determine useful doses and routes for administration in humans.

A therapeutically effective dose refers to that amount of active ingredient, for example GBAP or fragments thereof, antibodies of GBAP, and agonists, antagonists or inhibitors of GBAP, which
20 ameliorates the symptoms or condition. Therapeutic efficacy and toxicity may be determined by standard pharmaceutical procedures in cell cultures or with experimental animals, such as by calculating the ED_{50} (the dose therapeutically effective in 50% of the population) or LD_{50} (the dose lethal to 50% of the population) statistics. The dose ratio of toxic to therapeutic effects is the therapeutic index, which can be expressed as the LD_{50}/ED_{50} ratio. Pharmaceutical compositions which
25 exhibit large therapeutic indices are preferred. The data obtained from cell culture assays and animal studies are used to formulate a range of dosage for human use. The dosage contained in such compositions is preferably within a range of circulating concentrations that includes the ED_{50} with little or no toxicity. The dosage varies within this range depending upon the dosage form employed, the sensitivity of the patient, and the route of administration.

30 The exact dosage will be determined by the practitioner, in light of factors related to the subject requiring treatment. Dosage and administration are adjusted to provide sufficient levels of the active moiety or to maintain the desired effect. Factors which may be taken into account include the severity of the disease state, the general health of the subject, the age, weight, and gender of the subject, time and frequency of administration, drug combination(s), reaction sensitivities, and response to therapy.
35 Long-acting pharmaceutical compositions may be administered every 3 to 4 days, every week, or

biweekly depending on the half-life and clearance rate of the particular formulation.

Normal dosage amounts may vary from about 0.1 μg to 100,000 μg , up to a total dose of about 1 gram, depending upon the route of administration. Guidance as to particular dosages and methods of delivery is provided in the literature and generally available to practitioners in the art.

- 5 Those skilled in the art will employ different formulations for nucleotides than for proteins or their inhibitors. Similarly, delivery of polynucleotides or polypeptides will be specific to particular cells, conditions, locations, etc.

DIAGNOSTICS

- In another embodiment, antibodies which specifically bind GBAP may be used for the diagnosis
10 of disorders characterized by expression of GBAP, or in assays to monitor patients being treated with GBAP or agonists, antagonists, or inhibitors of GBAP. Antibodies useful for diagnostic purposes may be prepared in the same manner as described above for therapeutics. Diagnostic assays for GBAP include methods which utilize the antibody and a label to detect GBAP in human body fluids or in extracts of cells or tissues. The antibodies may be used with or without modification, and may be
15 labeled by covalent or non-covalent attachment of a reporter molecule. A wide variety of reporter molecules, several of which are described above, are known in the art and may be used.

- A variety of protocols for measuring GBAP, including ELISAs, RIAs, and FACS, are known in the art and provide a basis for diagnosing altered or abnormal levels of GBAP expression. Normal or standard values for GBAP expression are established by combining body fluids or cell extracts taken
20 from normal mammalian subjects, for example, human subjects, with antibody to GBAP under conditions suitable for complex formation. The amount of standard complex formation may be quantitated by various methods, such as photometric means. Quantities of GBAP expressed in subject, control, and disease samples from biopsied tissues are compared with the standard values. Deviation between standard and subject values establishes the parameters for diagnosing disease.

- 25 In another embodiment of the invention, the polynucleotides encoding GBAP may be used for diagnostic purposes. The polynucleotides which may be used include oligonucleotide sequences, complementary RNA and DNA molecules, and PNAs. The polynucleotides may be used to detect and quantify gene expression in biopsied tissues in which expression of GBAP may be correlated with disease. The diagnostic assay may be used to determine absence, presence, and excess expression of
30 GBAP, and to monitor regulation of GBAP levels during therapeutic intervention.

- In one aspect, hybridization with PCR probes which are capable of detecting polynucleotide sequences, including genomic sequences, encoding GBAP or closely related molecules may be used to identify nucleic acid sequences which encode GBAP. The specificity of the probe, whether it is made from a highly specific region, e.g., the 5' regulatory region, or from a less specific region, e.g., a
35 conserved motif, and the stringency of the hybridization or amplification will determine whether the

probe identifies only naturally occurring sequences encoding GBAP, allelic variants, or related sequences.

Probes may also be used for the detection of related sequences, and may have at least 50% sequence identity to any of the GBAP encoding sequences. The hybridization probes of the subject
5 invention may be DNA or RNA and may be derived from the sequence of SEQ ID NO:67-132 or from genomic sequences including promoters, enhancers, and introns of the GBAP gene.

Means for producing specific hybridization probes for DNAs encoding GBAP include the cloning of polynucleotide sequences encoding GBAP or GBAP derivatives into vectors for the production of mRNA probes. Such vectors are known in the art, are commercially available, and may
10 be used to synthesize RNA probes in vitro by means of the addition of the appropriate RNA polymerases and the appropriate labeled nucleotides. Hybridization probes may be labeled by a variety of reporter groups, for example, by radionuclides such as ^{32}P or ^{35}S , or by enzymatic labels, such as alkaline phosphatase coupled to the probe via avidin/biotin coupling systems, and the like.

Polynucleotide sequences encoding GBAP may be used for the diagnosis of disorders
15 associated with expression of GBAP. Examples of such disorders include, but are not limited to, an immune system disorder such as inflammation, actinic keratosis, acquired immunodeficiency syndrome (AIDS), Addison's disease, adult respiratory distress syndrome, allergies, ankylosing spondylitis, amyloidosis, anemia, arteriosclerosis, asthma, atherosclerosis, autoimmune hemolytic anemia, autoimmune thyroiditis, bronchitis, bursitis, cholecystitis, cirrhosis, contact dermatitis,
20 Crohn's disease, atopic dermatitis, dermatomyositis, diabetes mellitus, emphysema, erythroblastosis fetalis, erythema nodosum, atrophic gastritis, glomerulonephritis, Goodpasture's syndrome, gout, Graves' disease, Hashimoto's thyroiditis, paroxysmal nocturnal hemoglobinuria, hepatitis, hypereosinophilia, irritable bowel syndrome, episodic lymphopenia with lymphocytotoxins, mixed connective tissue disease (MCTD), multiple sclerosis, myasthenia gravis, myocardial or pericardial
25 inflammation, myelofibrosis, osteoarthritis, osteoporosis, pancreatitis, polycythemia vera, polymyositis, psoriasis, Reiter's syndrome, rheumatoid arthritis, scleroderma, Sjögren's syndrome, systemic anaphylaxis, systemic lupus erythematosus, systemic sclerosis, primary thrombocythemia, thrombocytopenic purpura, ulcerative colitis, uveitis, Werner syndrome, complications of cancer, hemodialysis, and extracorporeal circulation, trauma, and hematopoietic cancer including lymphoma,
30 leukemia, and myeloma; a reproductive disorder such as a disorder of prolactin production, infertility, including tubal disease, ovulatory defects, and endometriosis, a disruption of the estrous cycle, a disruption of the menstrual cycle, polycystic ovary syndrome, ovarian hyperstimulation syndrome, an endometrial or ovarian tumor, a uterine fibroid, autoimmune disorders, an ectopic pregnancy, and teratogenesis, cancer of the breast, fibrocystic breast disease, and galactorrhea, a disruption of
35 spermatogenesis, abnormal sperm physiology, cancer of the testis, cancer of the prostate, benign

prostatic hyperplasia, prostatitis, Peyronie's disease, impotence, carcinoma of the male breast, and gynecomastia; a nervous system disorder such as epilepsy, ischemic cerebrovascular disease, stroke, cerebral neoplasms, Alzheimer's disease, Pick's disease, Huntington's disease, dementia, Parkinson's disease and other extrapyramidal disorders, amyotrophic lateral sclerosis and other motor neuron disorders, progressive neural muscular atrophy, retinitis pigmentosa, hereditary ataxias, multiple sclerosis and other demyelinating diseases, bacterial and viral meningitis, brain abscess, subdural empyema, epidural abscess, suppurative intracranial thrombophlebitis, myelitis and radiculitis, viral central nervous system disease, prion diseases including kuru, Creutzfeldt-Jakob disease, and Gerstmann-Straussler-Scheinker syndrome, fatal familial insomnia, nutritional and metabolic diseases of the nervous system, neurofibromatosis, tuberous sclerosis, cerebelloretinal hemangioblastomatosis, encephalotrigeminal syndrome, mental retardation and other developmental disorders of the central nervous system, cerebral palsy, neuroskeletal disorders, autonomic nervous system disorders, cranial nerve disorders, spinal cord diseases, muscular dystrophy and other neuromuscular disorders, peripheral nervous system disorders, dermatomyositis and polymyositis, inherited, metabolic, endocrine, and toxic myopathies, myasthenia gravis, periodic paralysis, mental disorders including mood, anxiety, and schizophrenic disorders, akathisia, amnesia, catatonia, diabetic neuropathy, tardive dyskinesia, dystonias, paranoid psychoses, postherpetic neuralgia, and Tourette's disorder; a cell signaling disorder including endocrine disorders such as disorders of the hypothalamus and pituitary resulting from lesions such as primary brain tumors, adenomas, infarction associated with pregnancy, hypophysectomy, aneurysms, vascular malformations, thrombosis, infections, immunological disorders, and complications due to head trauma; disorders associated with hyperpituitarism including acromegaly, gigantism, and syndrome of inappropriate antidiuretic hormone (ADH) secretion (SIADH) often caused by benign adenoma; disorders associated with hypothyroidism including goiter, myxedema, acute thyroiditis associated with bacterial infection; disorders associated with hyperparathyroidism including Conn disease (chronic hypercalcemia); pancreatic disorders such as Type I or Type II diabetes mellitus and associated complications; disorders associated with the adrenals such as hyperplasia, carcinoma, or adenoma of the adrenal cortex, hypertension associated with alkalosis; disorders associated with gonadal steroid hormones such as: in women, abnormal prolactin production, infertility, endometriosis, perturbations of the menstrual cycle, polycystic ovarian disease, hyperprolactinemia, isolated gonadotropin deficiency, amenorrhea, galactorrhea, hermaphroditism, hirsutism and virilization, breast cancer, and, in post-menopausal women, osteoporosis; and, in men, Leydig cell deficiency, male climacteric phase, and germinal cell aplasia, hypergonadal disorders associated with Leydig cell tumors, androgen resistance associated with absence of androgen receptors, syndrome of 5 α -reductase, and gynecomastia; and a cell proliferative disorder such as actinic keratosis, arteriosclerosis, atherosclerosis, bursitis, cirrhosis, hepatitis, mixed connective tissue disease (MCTD), myelofibrosis, paroxysmal nocturnal

hemoglobinuria, polycythemia vera, psoriasis, primary thrombocythemia, and cancers including adenocarcinoma, leukemia, lymphoma, melanoma, myeloma, sarcoma, teratocarcinoma, and, in particular, cancers of the adrenal gland, bladder, bone, bone marrow, brain, breast, cervix, gall bladder, ganglia, gastrointestinal tract, heart, kidney, liver, lung, muscle, ovary, pancreas, parathyroid, 5 penis, prostate, salivary glands, skin, spleen, testis, thymus, thyroid, and uterus. The polynucleotide sequences encoding GBAP may be used in Southern or northern analysis, dot blot, or other membrane-based technologies; in PCR technologies; in dipstick, pin, and multiformat ELISA-like assays; and in microarrays utilizing fluids or tissues from patients to detect altered GBAP expression. Such qualitative or quantitative methods are well known in the art.

10 In a particular aspect, the nucleotide sequences encoding GBAP may be useful in assays that detect the presence of associated disorders, particularly those mentioned above. The nucleotide sequences encoding GBAP may be labeled by standard methods and added to a fluid or tissue sample from a patient under conditions suitable for the formation of hybridization complexes. After a suitable incubation period, the sample is washed and the signal is quantified and compared with a standard 15 value. If the amount of signal in the patient sample is significantly altered in comparison to a control sample then the presence of altered levels of nucleotide sequences encoding GBAP in the sample indicates the presence of the associated disorder. Such assays may also be used to evaluate the efficacy of a particular therapeutic treatment regimen in animal studies, in clinical trials, or to monitor the treatment of an individual patient.

20 In order to provide a basis for the diagnosis of a disorder associated with expression of GBAP, a normal or standard profile for expression is established. This may be accomplished by combining body fluids or cell extracts taken from normal subjects, either animal or human, with a sequence, or a fragment thereof, encoding GBAP, under conditions suitable for hybridization or amplification. Standard hybridization may be quantified by comparing the values obtained from normal subjects with 25 values from an experiment in which a known amount of a substantially purified polynucleotide is used. Standard values obtained in this manner may be compared with values obtained from samples from patients who are symptomatic for a disorder. Deviation from standard values is used to establish the presence of a disorder.

Once the presence of a disorder is established and a treatment protocol is initiated, 30 hybridization assays may be repeated on a regular basis to determine if the level of expression in the patient begins to approximate that which is observed in the normal subject. The results obtained from successive assays may be used to show the efficacy of treatment over a period ranging from several days to months.

With respect to cancer, the presence of an abnormal amount of transcript (either under- or 35 overexpressed) in biopsied tissue from an individual may indicate a predisposition for the development

of the disease, or may provide a means for detecting the disease prior to the appearance of actual clinical symptoms. A more definitive diagnosis of this type may allow health professionals to employ preventative measures or aggressive treatment earlier thereby preventing the development or further progression of the cancer.

- 5 Additional diagnostic uses for oligonucleotides designed from the sequences encoding GBAP may involve the use of PCR. These oligomers may be chemically synthesized, generated enzymatically, or produced in vitro. Oligomers will preferably contain a fragment of a polynucleotide encoding GBAP, or a fragment of a polynucleotide complementary to the polynucleotide encoding GBAP, and will be employed under optimized conditions for identification of a specific gene or condition.
- 10 Oligomers may also be employed under less stringent conditions for detection or quantification of closely related DNA or RNA sequences.

- In a particular aspect, oligonucleotide primers derived from the polynucleotide sequences encoding GBAP may be used to detect single nucleotide polymorphisms (SNPs). SNPs are substitutions, insertions and deletions that are a frequent cause of inherited or acquired genetic disease
- 15 in humans. Methods of SNP detection include, but are not limited to, single-stranded conformation polymorphism (SSCP) and fluorescent SSCP (fSSCP) methods. In SSCP, oligonucleotide primers derived from the polynucleotide sequences encoding GBAP are used to amplify DNA using the polymerase chain reaction (PCR). The DNA may be derived, for example, from diseased or normal tissue, biopsy samples, bodily fluids, and the like. SNPs in the DNA cause differences in the secondary
- 20 and tertiary structures of PCR products in single-stranded form, and these differences are detectable using gel electrophoresis in non-denaturing gels. In fSSCP, the oligonucleotide primers are fluorescently labeled, which allows detection of the amplimers in high-throughput equipment such as DNA sequencing machines. Additionally, sequence database analysis methods, termed *in silico* SNP (isSNP), are capable of identifying polymorphisms by comparing the sequence of individual
- 25 overlapping DNA fragments which assemble into a common consensus sequence. These computer-based methods filter out sequence variations due to laboratory preparation of DNA and sequencing errors using statistical models and automated analyses of DNA sequence chromatograms. In the alternative, SNPs may be detected and characterized by mass spectrometry using, for example, the high throughput MASSARRAY system (Sequenom, Inc., San Diego CA).
- 30 Methods which may also be used to quantify the expression of GBAP include radiolabeling or biotinylating nucleotides, coamplification of a control nucleic acid, and interpolating results from standard curves. (See, e.g., Melby, P.C. et al. (1993) J. Immunol. Methods 159:235-244; Duplaa, C. et al. (1993) Anal. Biochem. 212:229-236.) The speed of quantitation of multiple samples may be accelerated by running the assay in a high-throughput format where the oligomer or polynucleotide of
- 35 interest is presented in various dilutions and a spectrophotometric or colorimetric response gives rapid

quantitation.

In further embodiments, oligonucleotides or longer fragments derived from any of the polynucleotide sequences described herein may be used as elements on a microarray. The microarray can be used in transcript imaging techniques which monitor the relative expression levels of large numbers of genes simultaneously as described in Seilhamer, J.J. et al., "Comparative Gene Transcript Analysis," U.S. Patent No. 5,840,484, incorporated herein by reference. The microarray may also be used to identify genetic variants, mutations, and polymorphisms. This information may be used to determine gene function, to understand the genetic basis of a disorder, to diagnose a disorder, to monitor progression/regression of disease as a function of gene expression, and to develop and monitor the activities of therapeutic agents in the treatment of disease. In particular, this information may be used to develop a pharmacogenomic profile of a patient in order to select the most appropriate and effective treatment regimen for that patient. For example, therapeutic agents which are highly effective and display the fewest side effects may be selected for a patient based on his/her pharmacogenomic profile.

In another embodiment, antibodies specific for GBAP, or GBAP or fragments thereof may be used as elements on a microarray. The microarray may be used to monitor or measure protein-protein interactions, drug-target interactions, and gene expression profiles, as described above.

A particular embodiment relates to the use of the polynucleotides of the present invention to generate a transcript image of a tissue or cell type. A transcript image represents the global pattern of gene expression by a particular tissue or cell type. Global gene expression patterns are analyzed by quantifying the number of expressed genes and their relative abundance under given conditions and at a given time. (See Seilhamer et al., "Comparative Gene Transcript Analysis," U.S. Patent Number 5,840,484, expressly incorporated by reference herein.) Thus a transcript image may be generated by hybridizing the polynucleotides of the present invention or their complements to the totality of transcripts or reverse transcripts of a particular tissue or cell type. In one embodiment, the hybridization takes place in high-throughput format, wherein the polynucleotides of the present invention or their complements comprise a subset of a plurality of elements on a microarray. The resultant transcript image would provide a profile of gene activity.

Transcript images may be generated using transcripts isolated from tissues, cell lines, biopsies, or other biological samples. The transcript image may thus reflect gene expression in vivo, as in the case of a tissue or biopsy sample, or in vitro, as in the case of a cell line.

Transcript images which profile the expression of the polynucleotides of the present invention may also be used in conjunction with in vitro model systems and preclinical evaluation of pharmaceuticals, as well as toxicological testing of industrial and naturally-occurring environmental compounds. All compounds induce characteristic gene expression patterns, frequently termed molecular fingerprints or toxicant signatures, which are indicative of mechanisms of action and toxicity

(Nuwaysir, E.F. et al. (1999) Mol. Carcinog. 24:153-159; Steiner, S. and N.L. Anderson (2000) Toxicol. Lett. 112-113:467-471, expressly incorporated by reference herein). If a test compound has a signature similar to that of a compound with known toxicity, it is likely to share those toxic properties. These fingerprints or signatures are most useful and refined when they contain expression information from a large number of genes and gene families. Ideally, a genome-wide measurement of expression provides the highest quality signature. Even genes whose expression is not altered by any tested compounds are important as well, as the levels of expression of these genes are used to normalize the rest of the expression data. The normalization procedure is useful for comparison of expression data after treatment with different compounds. While the assignment of gene function to elements of a toxicant signature aids in interpretation of toxicity mechanisms, knowledge of gene function is not necessary for the statistical matching of signatures which leads to prediction of toxicity. (See, for example, Press Release 00-02 from the National Institute of Environmental Health Sciences, released February 29, 2000, available at <http://www.niehs.nih.gov/oc/news/toxchip.htm>.) Therefore, it is important and desirable in toxicological screening using toxicant signatures to include all expressed gene sequences.

In one embodiment, the toxicity of a test compound is assessed by treating a biological sample containing nucleic acids with the test compound. Nucleic acids that are expressed in the treated biological sample are hybridized with one or more probes specific to the polynucleotides of the present invention, so that transcript levels corresponding to the polynucleotides of the present invention may be quantified. The transcript levels in the treated biological sample are compared with levels in an untreated biological sample. Differences in the transcript levels between the two samples are indicative of a toxic response caused by the test compound in the treated sample.

Another particular embodiment relates to the use of the polypeptide sequences of the present invention to analyze the proteome of a tissue or cell type. The term proteome refers to the global pattern of protein expression in a particular tissue or cell type. Each protein component of a proteome can be subjected individually to further analysis. Proteome expression patterns, or profiles, are analyzed by quantifying the number of expressed proteins and their relative abundance under given conditions and at a given time. A profile of a cell's proteome may thus be generated by separating and analyzing the polypeptides of a particular tissue or cell type. In one embodiment, the separation is achieved using two-dimensional gel electrophoresis, in which proteins from a sample are separated by isoelectric focusing in the first dimension, and then according to molecular weight by sodium dodecyl sulfate slab gel electrophoresis in the second dimension (Steiner and Anderson, *supra*). The proteins are visualized in the gel as discrete and uniquely positioned spots, typically by staining the gel with an agent such as Coomassie Blue or silver or fluorescent stains. The optical density of each protein spot is generally proportional to the level of the protein in the sample. The optical densities of equivalently

positioned protein spots from different samples, for example, from biological samples either treated or untreated with a test compound or therapeutic agent, are compared to identify any changes in protein spot density related to the treatment. The proteins in the spots are partially sequenced using, for example, standard methods employing chemical or enzymatic cleavage followed by mass spectrometry.

5 The identity of the protein in a spot may be determined by comparing its partial sequence, preferably of at least 5 contiguous amino acid residues, to the polypeptide sequences of the present invention. In some cases, further sequence data may be obtained for definitive protein identification.

A proteomic profile may also be generated using antibodies specific for GBAP to quantify the levels of GBAP expression. In one embodiment, the antibodies are used as elements on a microarray, and protein expression levels are quantified by exposing the microarray to the sample and detecting the levels of protein bound to each array element (Lueking, A. et al. (1999) *Anal. Biochem.* 270:103-111; Mendoz, L.G. et al. (1999) *Biotechniques* 27:778-788). Detection may be performed by a variety of methods known in the art, for example, by reacting the proteins in the sample with a thiol- or amino-reactive fluorescent compound and detecting the amount of fluorescence bound at each array element.

15 Toxicant signatures at the proteome level are also useful for toxicological screening, and should be analyzed in parallel with toxicant signatures at the transcript level. There is a poor correlation between transcript and protein abundances for some proteins in some tissues (Anderson, N.L. and J. Seilhamer (1997) *Electrophoresis* 18:533-537), so proteome toxicant signatures may be useful in the analysis of compounds which do not significantly affect the transcript image, but which alter the proteomic profile. In addition, the analysis of transcripts in body fluids is difficult, due to rapid degradation of mRNA, so proteomic profiling may be more reliable and informative in such cases.

In another embodiment, the toxicity of a test compound is assessed by treating a biological sample containing proteins with the test compound. Proteins that are expressed in the treated biological sample are separated so that the amount of each protein can be quantified. The amount of each protein is compared to the amount of the corresponding protein in an untreated biological sample. A difference in the amount of protein between the two samples is indicative of a toxic response to the test compound in the treated sample. Individual proteins are identified by sequencing the amino acid residues of the individual proteins and comparing these partial sequences to the polypeptides of the present invention.

In another embodiment, the toxicity of a test compound is assessed by treating a biological sample containing proteins with the test compound. Proteins from the biological sample are incubated with antibodies specific to the polypeptides of the present invention. The amount of protein recognized by the antibodies is quantified. The amount of protein in the treated biological sample is compared with the amount in an untreated biological sample. A difference in the amount of protein between the two samples is indicative of a toxic response to the test compound in the treated sample.

35 Microarrays may be prepared, used, and analyzed using methods known in the art. (See, e.g.,

Brennan, T.M. et al. (1995) U.S. Patent No. 5,474,796; Schena, M. et al. (1996) Proc. Natl. Acad. Sci. USA 93:10614-10619; Baldeschweiler et al. (1995) PCT application WO95/251116; Shalon, D. et al. (1995) PCT application WO95/35505; Heller, R.A. et al. (1997) Proc. Natl. Acad. Sci. USA 94:2150-2155; and Heller, M.J. et al. (1997) U.S. Patent No. 5,605,662.) Various types of microarrays are well known and thoroughly described in DNA Microarrays: A Practical Approach, M. Schena, ed. (1999) Oxford University Press, London, hereby expressly incorporated by reference.

In another embodiment of the invention, nucleic acid sequences encoding GBAP may be used to generate hybridization probes useful in mapping the naturally occurring genomic sequence. Either coding or noncoding sequences may be used, and in some instances, noncoding sequences may be preferable over coding sequences. For example, conservation of a coding sequence among members of a multi-gene family may potentially cause undesired cross hybridization during chromosomal mapping. The sequences may be mapped to a particular chromosome, to a specific region of a chromosome, or to artificial chromosome constructions, e.g., human artificial chromosomes (HACs), yeast artificial chromosomes (YACs), bacterial artificial chromosomes (BACs), bacterial P1 constructions, or single chromosome cDNA libraries. (See, e.g., Harrington, J.J. et al. (1997) Nat. Genet. 15:345-355; Price, C.M. (1993) Blood Rev. 7:127-134; and Trask, B.J. (1991) Trends Genet. 7:149-154.) Once mapped, the nucleic acid sequences of the invention may be used to develop genetic linkage maps, for example, which correlate the inheritance of a disease state with the inheritance of a particular chromosome region or restriction fragment length polymorphism (RFLP). (See, e.g., Lander, E.S. and D. Botstein (1986) Proc. Natl. Acad. Sci. USA 83:7353-7357.)

Fluorescent in situ hybridization (FISH) may be correlated with other physical and genetic map data. (See, e.g., Heinz-Ulrich, et al. (1995) in Meyers, supra, pp. 965-968.) Examples of genetic map data can be found in various scientific journals or at the Online Mendelian Inheritance in Man (OMIM) World Wide Web site. Correlation between the location of the gene encoding GBAP on a physical map and a specific disorder, or a predisposition to a specific disorder, may help define the region of DNA associated with that disorder and thus may further positional cloning efforts.

In situ hybridization of chromosomal preparations and physical mapping techniques, such as linkage analysis using established chromosomal markers, may be used for extending genetic maps. Often the placement of a gene on the chromosome of another mammalian species, such as mouse, may reveal associated markers even if the exact chromosomal locus is not known. This information is valuable to investigators searching for disease genes using positional cloning or other gene discovery techniques. Once the gene or genes responsible for a disease or syndrome have been crudely localized by genetic linkage to a particular genomic region, e.g., ataxia-telangiectasia to 11q22-23, any sequences mapping to that area may represent associated or regulatory genes for further investigation. (See, e.g., Gatti, R.A. et al. (1988) Nature 336:577-580.) The nucleotide sequence of the instant invention may

also be used to detect differences in the chromosomal location due to translocation, inversion, etc., among normal, carrier, or affected individuals.

In another embodiment of the invention, GBAP, its catalytic or immunogenic fragments, or oligopeptides thereof can be used for screening libraries of compounds in any of a variety of drug screening techniques. The fragment employed in such screening may be free in solution, affixed to a solid support, borne on a cell surface, or located intracellularly. The formation of binding complexes between GBAP and the agent being tested may be measured.

Another technique for drug screening provides for high throughput screening of compounds having suitable binding affinity to the protein of interest. (See, e.g., Geysen, et al. (1984) PCT application WO84/03564.) In this method, large numbers of different small test compounds are synthesized on a solid substrate. The test compounds are reacted with GBAP, or fragments thereof, and washed. Bound GBAP is then detected by methods well known in the art. Purified GBAP can also be coated directly onto plates for use in the aforementioned drug screening techniques. Alternatively, non-neutralizing antibodies can be used to capture the peptide and immobilize it on a solid support.

In another embodiment, one may use competitive drug screening assays in which neutralizing antibodies capable of binding GBAP specifically compete with a test compound for binding GBAP. In this manner, antibodies can be used to detect the presence of any peptide which shares one or more antigenic determinants with GBAP.

In additional embodiments, the nucleotide sequences which encode GBAP may be used in any molecular biology techniques that have yet to be developed, provided the new techniques rely on properties of nucleotide sequences that are currently known, including, but not limited to, such properties as the triplet genetic code and specific base pair interactions.

Without further elaboration, it is believed that one skilled in the art can, using the preceding description, utilize the present invention to its fullest extent. The following preferred specific embodiments are, therefore, to be construed as merely illustrative, and not limitative of the remainder of the disclosure in any way whatsoever.

The disclosures of all patents, applications and publications, mentioned above and below, in particular U.S. Ser. No. 60/144,595, U.S. Ser. No. 60/150,460, and U.S. Ser. No. 60/159,849, are hereby expressly incorporated by reference.

EXAMPLES

I. Construction of cDNA Libraries

RNA was purchased from Clontech or isolated from tissues described in Table 4. Some tissues were homogenized and lysed in guanidinium isothiocyanate, while others were homogenized and lysed in phenol or in a suitable mixture of denaturants, such as TRIZOL (Life Technologies), a monophasic

solution of phenol and guanidine isothiocyanate. The resulting lysates were centrifuged over CsCl cushions or extracted with chloroform. RNA was precipitated from the lysates with either isopropanol or sodium acetate and ethanol, or by other routine methods.

Phenol extraction and precipitation of RNA were repeated as necessary to increase RNA
5 purity. In some cases, RNA was treated with DNase. For most libraries, poly(A+) RNA was isolated using oligo d(T)-coupled paramagnetic particles (Promega), OLIGOTEX latex particles (QIAGEN, Chatsworth CA), or an OLIGOTEX mRNA purification kit (QIAGEN). Alternatively, RNA was isolated directly from tissue lysates using other RNA isolation kits, e.g., the POLY(A)PURE mRNA purification kit (Ambion, Austin TX).

10 In some cases, Stratagene was provided with RNA and constructed the corresponding cDNA libraries. Otherwise, cDNA was synthesized and cDNA libraries were constructed with the UNIZAP vector system (Stratagene) or SUPERScript plasmid system (Life Technologies), using the recommended procedures or similar methods known in the art. (See, e.g., Ausubel, 1997, supra, units 5.1-6.6.) Reverse transcription was initiated using oligo d(T) or random primers. Synthetic
15 oligonucleotide adapters were ligated to double stranded cDNA, and the cDNA was digested with the appropriate restriction enzyme or enzymes. For most libraries, the cDNA was size-selected (300-1000 bp) using SEPHACRYL S1000, SEPHAROSE CL2B, or SEPHAROSE CL4B column chromatography (Amersham Pharmacia Biotech) or preparative agarose gel electrophoresis. cDNAs were ligated into compatible restriction enzyme sites of the polylinker of a suitable plasmid, e.g.,
20 PBLUESCRIPT plasmid (Stratagene), PSORT1 plasmid (Life Technologies), pcDNA2.1 plasmid (Invitrogen, Carlsbad CA), or pINCY plasmid (Incyte Genomics, Palo Alto CA). Recombinant plasmids were transformed into competent *E. coli* cells including XL1-Blue, XL1-BlueMRF, or SOLR from Stratagene or DH5 α , DH10B, or ElectroMAX DH10B from Life Technologies.

II. Isolation of cDNA Clones

25 Plasmids obtained as described in Example I were recovered from host cells by in vivo excision using the UNIZAP vector system (Stratagene) or by cell lysis. Plasmids were purified using at least one of the following: a Magic or WIZARD Minipreps DNA purification system (Promega); an AGTC Miniprep purification kit (Edge Biosystems, Gaithersburg MD); and QIAWELL 8 Plasmid, QIAWELL 8 Plus Plasmid, QIAWELL 8 Ultra Plasmid purification systems or the R.E.A.L. PREP 96 plasmid
30 purification kit from QIAGEN. Following precipitation, plasmids were resuspended in 0.1 ml of distilled water and stored, with or without lyophilization, at 4°C.

Alternatively, plasmid DNA was amplified from host cell lysates using direct link PCR in a high-throughput format (Rao, V.B. (1994) Anal. Biochem. 216:1-14). Host cell lysis and thermal
cycling steps were carried out in a single reaction mixture. Samples were processed and stored in 384-
35 well plates, and the concentration of amplified plasmid DNA was quantified fluorometrically using

PICOGREEN dye (Molecular Probes, Eugene OR) and a FLUOROSKAN II fluorescence scanner (Labsystems Oy, Helsinki, Finland).

III. Sequencing and Analysis

Incye cDNA recovered in plasmids as described in Example II were sequenced as follows.

- 5 Sequencing reactions were processed using standard methods or high-throughput instrumentation such as the ABI CATALYST 800 (PE Biosystems) thermal cyclor or the PTC-200 thermal cyclor (MJ Research) in conjunction with the HYDRA microdispenser (Robbins Scientific) or the MICROLAB 2200 (Hamilton) liquid transfer system. cDNA sequencing reactions were prepared using reagents provided by Amersham Pharmacia Biotech or supplied in ABI sequencing kits such as the ABI
- 10 PRISM BIGDYE Terminator cycle sequencing ready reaction kit (PE Biosystems). Electrophoretic separation of cDNA sequencing reactions and detection of labeled polynucleotides were carried out using the MEGABACE 1000 DNA sequencing system (Molecular Dynamics); the ABI PRISM 373 or 377 sequencing system (PE Biosystems) in conjunction with standard ABI protocols and base calling software; or other sequence analysis systems known in the art. Reading frames within the cDNA
- 15 sequences were identified using standard methods (reviewed in Ausubel, 1997, *supra*, unit 7.7). Some of the cDNA sequences were selected for extension using the techniques disclosed in Example VI.

The polynucleotide sequences derived from cDNA sequencing were assembled and analyzed using a combination of software programs which utilize algorithms well known to those skilled in the art. Table 5 summarizes the tools, programs, and algorithms used and provides applicable descriptions,

20 references, and threshold parameters. The first column of Table 5 shows the tools, programs, and algorithms used, the second column provides brief descriptions thereof, the third column presents appropriate references, all of which are incorporated by reference herein in their entirety, and the fourth column presents, where applicable, the scores, probability values, and other parameters used to evaluate the strength of a match between two sequences (the higher the score, the greater the homology between

25 two sequences). Sequences were analyzed using MACDNASIS PRO software (Hitachi Software Engineering, South San Francisco CA) and LASERGENE software (DNASTAR). Polynucleotide and polypeptide sequence alignments were generated using the default parameters specified by the clustal algorithm as incorporated into the MEGALIGN multisequence alignment program (DNASTAR), which also calculates the percent identity between aligned sequences.

- 30 The polynucleotide sequences were validated by removing vector, linker, and polyA sequences and by masking ambiguous bases, using algorithms and programs based on BLAST, dynamic programing, and dinucleotide nearest neighbor analysis. The sequences were then queried against a selection of public databases such as the GenBank primate, rodent, mammalian, vertebrate, and eukaryote databases, and BLOCKS, PRINTS, DOMO, PRODOM, and PFAM to acquire annotation
- 35 using programs based on BLAST, FASTA, and BLIMPS. The sequences were assembled into full

length polynucleotide sequences using programs based on Phred, Phrap, and Consed, and were screened for open reading frames using programs based on GeneMark, BLAST, and FASTA. The full length polynucleotide sequences were translated to derive the corresponding full length amino acid sequences, and these full length sequences were subsequently analyzed by querying against databases such as the
 5 GenBank databases (described above), SwissProt, BLOCKS, PRINTS, DOMO, PRODOM, Prosite, and Hidden Markov Model (HMM)-based protein family databases such as PFAM. HMM is a probabilistic approach which analyzes consensus primary structures of gene families. (See, e.g., Eddy, S.R. (1996) Curr. Opin. Struct. Biol. 6:361-365.)

The programs described above for the assembly and analysis of full length polynucleotide and
 10 amino acid sequences were also used to identify polynucleotide sequence fragments from SEQ ID NO:67-132. Fragments from about 20 to about 4000 nucleotides which are useful in hybridization and amplification technologies were described in The Invention section above.

IV. Analysis of Polynucleotide Expression

Northern analysis is a laboratory technique used to detect the presence of a transcript of a gene
 15 and involves the hybridization of a labeled nucleotide sequence to a membrane on which RNAs from a particular cell type or tissue have been bound. (See, e.g., Sambrook, supra, ch. 7; Ausubel, 1995, supra, ch. 4 and 16.)

Analogous computer techniques applying BLAST were used to search for identical or related molecules in cDNA databases such as GenBank or LIFESEQ (Incyte Genomics). This analysis is
 20 much faster than multiple membrane-based hybridizations. In addition, the sensitivity of the computer search can be modified to determine whether any particular match is categorized as exact or similar. The basis of the search is the product score, which is defined as:

$$\frac{\text{BLAST Score} \times \text{Percent Identity}}{5 \times \text{minimum} \{ \text{length}(\text{Seq. 1}), \text{length}(\text{Seq. 2}) \}}$$

25

The product score takes into account both the degree of similarity between two sequences and the length of the sequence match. The product score is a normalized value between 0 and 100, and is calculated as follows: the BLAST score is multiplied by the percent nucleotide identity and the product is divided by (5 times the length of the shorter of the two sequences). The BLAST score is calculated by
 30 assigning a score of +5 for every base that matches in a high-scoring segment pair (HSP), and -4 for every mismatch. Two sequences may share more than one HSP (separated by gaps). If there is more than one HSP, then the pair with the highest BLAST score is used to calculate the product score. The product score represents a balance between fractional overlap and quality in a BLAST alignment. For example, a product score of 100 is produced only for 100% identity over the entire length of the shorter
 35 of the two sequences being compared. A product score of 70 is produced either by 100% identity and

70% overlap at one end, or by 88% identity and 100% overlap at the other. A product score of 50 is produced either by 100% identity and 50% overlap at one end, or 79% identity and 100% overlap.

The results of northern analyses are reported as a percentage distribution of libraries in which the transcript encoding GBAP occurred. Analysis involved the categorization of cDNA libraries by organ/tissue and disease. The organ/tissue categories included cardiovascular, dermatologic, developmental, endocrine, gastrointestinal, hematopoietic/immune, musculoskeletal, nervous, reproductive, and urologic. The disease/condition categories included cancer, inflammation, trauma, cell proliferation, neurological, and pooled. For each category, the number of libraries expressing the sequence of interest was counted and divided by the total number of libraries across all categories.

10 Percentage values of tissue-specific and disease- or condition-specific expression are reported in Table 3.

V. Chromosomal Mapping of GBAP Encoding Polynucleotides

The cDNA sequences which were used to assemble SEQ ID NO:67-132 were compared with sequences from the Incyte LIFESEQ database and public domain databases using BLAST and other implementations of the Smith-Waterman algorithm. Sequences from these databases that matched SEQ ID NO:67-132 were assembled into clusters of contiguous and overlapping sequences using assembly algorithms such as Phrap (Table 5). Radiation hybrid and genetic mapping data available from public resources such as the Stanford Human Genome Center (SHGC), Whitehead Institute for Genome Research (WIGR), and Généthon were used to determine if any of the clustered sequences had been previously mapped. Inclusion of a mapped sequence in a cluster resulted in the assignment of all sequences of that cluster, including its particular SEQ ID NO:, to that map location.

The genetic map locations of SEQ ID NO:70, 74, 75, 77, 80, 86, 87, 90, 92, 93, 94, 97, 101, 106, 109, 111, 112, 113, 115, 117, 118, 121, and 128 are described in The Invention as ranges, or intervals, of human chromosomes. More than one map location is reported for SEQ ID NO:94, 101, 109, 111, and 115, indicating that previously mapped sequences having similarity, but not complete identity, to SEQ ID NO:94, 101, 109, 111, and 115 were assembled into their respective clusters.

The map position of an interval, in centiMorgans, is measured relative to the terminus of the chromosome's p-arm. (The centiMorgan (cM) is a unit of measurement based on recombination frequencies between chromosomal markers. On average, 1 cM is roughly equivalent to 1 megabase (Mb) of DNA in humans, although this can vary widely due to hot and cold spots of recombination.) The cM distances are based on genetic markers mapped by Généthon which provide boundaries for radiation hybrid markers whose sequences were included in each of the clusters.

VI. Extension of GBAP Encoding Polynucleotides

The full length nucleic acid sequences of SEQ ID NO:67-132 were produced by extension of an appropriate fragment of the full length molecule using oligonucleotide primers designed from this

fragment. One primer was synthesized to initiate 5' extension of the known fragment, and the other primer, to initiate 3' extension of the known fragment. The initial primers were designed using OLIGO 4.06 software (National Biosciences), or another appropriate program, to be about 22 to 30 nucleotides in length, to have a GC content of about 50% or more, and to anneal to the target sequence at 5 temperatures of about 68°C to about 72°C. Any stretch of nucleotides which would result in hairpin structures and primer-primer dimerizations was avoided.

Selected human cDNA libraries were used to extend the sequence. If more than one extension was necessary or desired, additional or nested sets of primers were designed.

High fidelity amplification was obtained by PCR using methods well known in the art. PCR 10 was performed in 96-well plates using the PTC-200 thermal cycler (MJ Research, Inc.). The reaction mix contained DNA template, 200 nmol of each primer, reaction buffer containing Mg^{2+} , $(NH_4)_2SO_4$, and β -mercaptoethanol, Taq DNA polymerase (Amersham Pharmacia Biotech), ELONGASE enzyme (Life Technologies), and Pfu DNA polymerase (Stratagene), with the following parameters for primer pair PCI A and PCI B: Step 1: 94°C, 3 min; Step 2: 94°C, 15 sec; Step 3: 60°C, 1 min; Step 4: 68°C, 15 2 min; Step 5: Steps 2, 3, and 4 repeated 20 times; Step 6: 68°C, 5 min; Step 7: storage at 4°C. In the alternative, the parameters for primer pair T7 and SK+ were as follows: Step 1: 94°C, 3 min; Step 2: 94°C, 15 sec; Step 3: 57°C, 1 min; Step 4: 68°C, 2 min; Step 5: Steps 2, 3, and 4 repeated 20 times; Step 6: 68°C, 5 min; Step 7: storage at 4°C.

The concentration of DNA in each well was determined by dispensing 100 μ l PICOGREEN 20 quantitation reagent (0.25% (v/v) PICOGREEN; Molecular Probes, Eugene OR) dissolved in 1X TE and 0.5 μ l of undiluted PCR product into each well of an opaque fluorimeter plate (Corning Costar, Acton MA), allowing the DNA to bind to the reagent. The plate was scanned in a Fluoroskan II (Labsystems Oy, Helsinki, Finland) to measure the fluorescence of the sample and to quantify the concentration of DNA. A 5 μ l to 10 μ l aliquot of the reaction mixture was analyzed by electrophoresis 25 on a 1 % agarose mini-gel to determine which reactions were successful in extending the sequence.

The extended nucleotides were desalted and concentrated, transferred to 384-well plates, digested with CviJI cholera virus endonuclease (Molecular Biology Research, Madison WI), and sonicated or sheared prior to religation into pUC 18 vector (Amersham Pharmacia Biotech). For shotgun sequencing, the digested nucleotides were separated on low concentration (0.6 to 0.8%) agarose 30 gels, fragments were excised, and agar digested with Agar ACE (Promega). Extended clones were religated using T4 ligase (New England Biolabs, Beverly MA) into pUC 18 vector (Amersham Pharmacia Biotech), treated with Pfu DNA polymerase (Stratagene) to fill-in restriction site overhangs, and transfected into competent *E. coli* cells. Transformed cells were selected on antibiotic-containing media, and individual colonies were picked and cultured overnight at 37°C in 384-well plates in LB/2x 35 carb liquid media.

The cells were lysed, and DNA was amplified by PCR using Taq DNA polymerase (Amersham Pharmacia Biotech) and Pfu DNA polymerase (Stratagene) with the following parameters: Step 1: 94°C, 3 min; Step 2: 94°C, 15 sec; Step 3: 60°C, 1 min; Step 4: 72°C, 2 min; Step 5: steps 2, 3, and 4 repeated 29 times; Step 6: 72°C, 5 min; Step 7: storage at 4°C. DNA was quantified by PICOGREEN reagent (Molecular Probes) as described above. Samples with low DNA recoveries were reamplified using the same conditions as described above. Samples were diluted with 20% dimethylsulfoxide (1:2, v/v), and sequenced using DYENAMIC energy transfer sequencing primers and the DYENAMIC DIRECT kit (Amersham Pharmacia Biotech) or the ABI PRISM BIGDYE Terminator cycle sequencing ready reaction kit (PE Biosystems).

10 In like manner, the polynucleotide sequences of SEQ ID NO:67-132 are used to obtain 5' regulatory sequences using the procedure above, along with oligonucleotides designed for such extension, and an appropriate genomic library.

VII. Labeling and Use of Individual Hybridization Probes

Hybridization probes derived from SEQ ID NO:67-132 are employed to screen cDNAs, genomic DNAs, or mRNAs. Although the labeling of oligonucleotides, consisting of about 20 base pairs, is specifically described, essentially the same procedure is used with larger nucleotide fragments. Oligonucleotides are designed using state-of-the-art software such as OLIGO 4.06 software (National Biosciences) and labeled by combining 50 pmol of each oligomer, 250 μ Ci of [γ -³²P] adenosine triphosphate (Amersham Pharmacia Biotech), and T4 polynucleotide kinase (DuPont NEN, Boston MA). The labeled oligonucleotides are substantially purified using a SEPHADEX G-25 superfine size exclusion dextran bead column (Amersham Pharmacia Biotech). An aliquot containing 10⁷ counts per minute of the labeled probe is used in a typical membrane-based hybridization analysis of human genomic DNA digested with one of the following endonucleases: Ase I, Bgl II, Eco RI, Pst I, Xba I, or Pvu II (DuPont NEN).

25 The DNA from each digest is fractionated on a 0.7% agarose gel and transferred to nylon membranes (Nytran Plus, Schleicher & Schuell, Durham NH). Hybridization is carried out for 16 hours at 40°C. To remove nonspecific signals, blots are sequentially washed at room temperature under conditions of up to, for example, 0.1 x saline sodium citrate and 0.5% sodium dodecyl sulfate. Hybridization patterns are visualized using autoradiography or an alternative imaging means and compared.

VIII. Microarrays

The linkage or synthesis of array elements upon a microarray can be achieved utilizing photolithography, piezoelectric printing (ink-jet printing, See, e.g., Baldeschweiler, supra), mechanical microspotting technologies, and derivatives thereof. The substrate in each of the aforementioned technologies should be uniform and solid with a non-porous surface (Skena (1999), supra). Suggested

substrates include silicon, silica, glass slides, glass chips, and silicon wafers. Alternatively, a procedure analogous to a dot or slot blot may also be used to arrange and link elements to the surface of a substrate using thermal, UV, chemical, or mechanical bonding procedures. A typical array may be produced using available methods and machines well known to those of ordinary skill in the art and may contain any appropriate number of elements. (See, e.g., Schena, M. et al. (1995) *Science* 270:467-470; Shalon, D. et al. (1996) *Genome Res.* 6:639-645; Marshall, A. and J. Hodgson (1998) *Nat. Biotechnol.* 16:27-31.)

Full length cDNAs, Expressed Sequence Tags (ESTs), or fragments or oligomers thereof may comprise the elements of the microarray. Fragments or oligomers suitable for hybridization can be selected using software well known in the art such as LASERGENE software (DNASTAR). The array elements are hybridized with polynucleotides in a biological sample. The polynucleotides in the biological sample are conjugated to a fluorescent label or other molecular tag for ease of detection. After hybridization, nonhybridized nucleotides from the biological sample are removed, and a fluorescence scanner is used to detect hybridization at each array element. Alternatively, laser desorption and mass spectrometry may be used for detection of hybridization. The degree of complementarity and the relative abundance of each polynucleotide which hybridizes to an element on the microarray may be assessed. In one embodiment, microarray preparation and usage is described in detail below.

Tissue or Cell Sample Preparation

Total RNA is isolated from tissue samples using the guanidinium thiocyanate method and poly(A)⁺ RNA is purified using the oligo-(dT) cellulose method. Each poly(A)⁺ RNA sample is reverse transcribed using MMLV reverse-transcriptase, 0.05 pg/μl oligo-(dT) primer (21mer), 1X first strand buffer, 0.03 units/μl RNase inhibitor, 500 μM dATP, 500 μM dGTP, 500 μM dTTP, 40 μM dCTP, 40 μM dCTP-Cy3 (BDS) or dCTP-Cy5 (Amersham Pharmacia Biotech). The reverse transcription reaction is performed in a 25 ml volume containing 200 ng poly(A)⁺ RNA with GEMBRIGHT kits (Incyte). Specific control poly(A)⁺ RNAs are synthesized by in vitro transcription from non-coding yeast genomic DNA. After incubation at 37°C for 2 hr, each reaction sample (one with Cy3 and another with Cy5 labeling) is treated with 2.5 ml of 0.5M sodium hydroxide and incubated for 20 minutes at 85°C to stop the reaction and degrade the RNA. Samples are purified using two successive CHROMA SPIN 30 gel filtration spin columns (CLONTECH Laboratories, Inc. (CLONTECH), Palo Alto CA) and after combining, both reaction samples are ethanol precipitated using 1 ml of glycogen (1 mg/ml), 60 ml sodium acetate, and 300 ml of 100% ethanol. The sample is then dried to completion using a SpeedVAC (Savant Instruments Inc., Holbrook NY) and resuspended in 14 μl 5X SSC/0.2% SDS.

Microarray Preparation

Sequences of the present invention are used to generate array elements. Each array element is amplified from bacterial cells containing vectors with cloned cDNA inserts. PCR amplification uses primers complementary to the vector sequences flanking the cDNA insert. Array elements are amplified in thirty cycles of PCR from an initial quantity of 1-2 ng to a final quantity greater than 5 µg. Amplified array elements are then purified using SEPHACRYL-400 (Amersham Pharmacia Biotech).

Purified array elements are immobilized on polymer-coated glass slides. Glass microscope slides (Corning) are cleaned by ultrasound in 0.1% SDS and acetone, with extensive distilled water washes between and after treatments. Glass slides are etched in 4% hydrofluoric acid (VWR Scientific Products Corporation (VWR), West Chester PA), washed extensively in distilled water, and coated with 0.05% aminopropyl silane (Sigma) in 95% ethanol. Coated slides are cured in a 110°C oven.

Array elements are applied to the coated glass substrate using a procedure described in US Patent No. 5,807,522, incorporated herein by reference. 1 µl of the array element DNA, at an average concentration of 100 ng/µl, is loaded into the open capillary printing element by a high-speed robotic apparatus. The apparatus then deposits about 5 nl of array element sample per slide.

Microarrays are UV-crosslinked using a STRATALINKER UV-crosslinker (Stratagene). Microarrays are washed at room temperature once in 0.2% SDS and three times in distilled water. Non-specific binding sites are blocked by incubation of microarrays in 0.2% casein in phosphate buffered saline (PBS) (Tropix, Inc., Bedford MA) for 30 minutes at 60°C followed by washes in 0.2% SDS and distilled water as before.

Hybridization

Hybridization reactions contain 9 µl of sample mixture consisting of 0.2 µg each of Cy3 and Cy5 labeled cDNA synthesis products in 5X SSC, 0.2% SDS hybridization buffer. The sample mixture is heated to 65°C for 5 minutes and is aliquoted onto the microarray surface and covered with an 1.8 cm² coverslip. The arrays are transferred to a waterproof chamber having a cavity just slightly larger than a microscope slide. The chamber is kept at 100% humidity internally by the addition of 140 µl of 5X SSC in a corner of the chamber. The chamber containing the arrays is incubated for about 6.5 hours at 60°C. The arrays are washed for 10 min at 45°C in a first wash buffer (1X SSC, 0.1% SDS), three times for 10 minutes each at 45°C in a second wash buffer (0.1X SSC), and dried.

Detection

Reporter-labeled hybridization complexes are detected with a microscope equipped with an Innova 70 mixed gas 10 W laser (Coherent, Inc., Santa Clara CA) capable of generating spectral lines at 488 nm for excitation of Cy3 and at 632 nm for excitation of Cy5. The excitation laser light is focused on the array using a 20X microscope objective (Nikon, Inc., Melville NY). The slide

containing the array is placed on a computer-controlled X-Y stage on the microscope and raster-scanned past the objective. The 1.8 cm x 1.8 cm array used in the present example is scanned with a resolution of 20 micrometers.

In two separate scans, a mixed gas multiline laser excites the two fluorophores sequentially. 5
Emitted light is split, based on wavelength, into two photomultiplier tube detectors (PMT R1477, Hamamatsu Photonics Systems, Bridgewater NJ) corresponding to the two fluorophores. Appropriate filters positioned between the array and the photomultiplier tubes are used to filter the signals. The emission maxima of the fluorophores used are 565 nm for Cy3 and 650 nm for Cy5. Each array is typically scanned twice, one scan per fluorophore using the appropriate filters at the laser source, 10
although the apparatus is capable of recording the spectra from both fluorophores simultaneously.

The sensitivity of the scans is typically calibrated using the signal intensity generated by a cDNA control species added to the sample mixture at a known concentration. A specific location on the array contains a complementary DNA sequence, allowing the intensity of the signal at that location to be correlated with a weight ratio of hybridizing species of 1:100,000. When two samples 15
from different sources (e.g., representing test and control cells), each labeled with a different fluorophore, are hybridized to a single array for the purpose of identifying genes that are differentially expressed, the calibration is done by labeling samples of the calibrating cDNA with the two fluorophores and adding identical amounts of each to the hybridization mixture.

The output of the photomultiplier tube is digitized using a 12-bit RTI-835H analog-to-digital 20
(A/D) conversion board (Analog Devices, Inc., Norwood MA) installed in an IBM-compatible PC computer. The digitized data are displayed as an image where the signal intensity is mapped using a linear 20-color transformation to a pseudocolor scale ranging from blue (low signal) to red (high signal). The data is also analyzed quantitatively. Where two different fluorophores are excited and measured simultaneously, the data are first corrected for optical crosstalk (due to overlapping 25
emission spectra) between the fluorophores using each fluorophore's emission spectrum.

A grid is superimposed over the fluorescence signal image such that the signal from each spot is centered in each element of the grid. The fluorescence signal within each element is then integrated to obtain a numerical value corresponding to the average intensity of the signal. The software used for signal analysis is the GEMTOOLS gene expression analysis program (Incyte).

30 IX. Complementary Polynucleotides

Sequences complementary to the GBAP-encoding sequences, or any parts thereof, are used to detect, decrease, or inhibit expression of naturally occurring GBAP. Although use of oligonucleotides comprising from about 15 to 30 base pairs is described, essentially the same procedure is used with smaller or with larger sequence fragments. Appropriate oligonucleotides are designed using OLIGO 35
4.06 software (National Biosciences) and the coding sequence of GBAP. To inhibit transcription, a

complementary oligonucleotide is designed from the most unique 5' sequence and used to prevent promoter binding to the coding sequence. To inhibit translation, a complementary oligonucleotide is designed to prevent ribosomal binding to the GBAP-encoding transcript.

X. Expression of GBAP

5 Expression and purification of GBAP is achieved using bacterial or virus-based expression systems. For expression of GBAP in bacteria, cDNA is subcloned into an appropriate vector containing an antibiotic resistance gene and an inducible promoter that directs high levels of cDNA transcription. Examples of such promoters include, but are not limited to, the *trp-lac (tac)* hybrid promoter and the T5 or T7 bacteriophage promoter in conjunction with the *lac* operator regulatory
10 element. Recombinant vectors are transformed into suitable bacterial hosts, e.g., BL21(DE3). Antibiotic resistant bacteria express GBAP upon induction with isopropyl beta-D-thiogalactopyranoside (IPTG). Expression of GBAP in eukaryotic cells is achieved by infecting insect or mammalian cell lines with recombinant Autographica californica nuclear polyhedrosis virus (AcMNPV), commonly known as baculovirus. The nonessential polyhedrin gene of baculovirus is
15 replaced with cDNA encoding GBAP by either homologous recombination or bacterial-mediated transposition involving transfer plasmid intermediates. Viral infectivity is maintained and the strong polyhedrin promoter drives high levels of cDNA transcription. Recombinant baculovirus is used to infect Spodoptera frugiperda (Sf9) insect cells in most cases, or human hepatocytes, in some cases. Infection of the latter requires additional genetic modifications to baculovirus. (See Engelhard, E.K. et
20 al. (1994) Proc. Natl. Acad. Sci. USA 91:3224-3227; Sandig, V. et al. (1996) Hum. Gene Ther. 7:1937-1945.)

In most expression systems, GBAP is synthesized as a fusion protein with, e.g., glutathione S-transferase (GST) or a peptide epitope tag, such as FLAG or 6-His, permitting rapid, single-step, affinity-based purification of recombinant fusion protein from crude cell lysates. GST, a 26-kilodalton
25 enzyme from Schistosoma japonicum, enables the purification of fusion proteins on immobilized glutathione under conditions that maintain protein activity and antigenicity (Amersham Pharmacia Biotech). Following purification, the GST moiety can be proteolytically cleaved from GBAP at specifically engineered sites. FLAG, an 8-amino acid peptide, enables immunoaffinity purification using commercially available monoclonal and polyclonal anti-FLAG antibodies (Eastman Kodak). 6-
30 His, a stretch of six consecutive histidine residues, enables purification on metal-chelate resins (QIAGEN). Methods for protein expression and purification are discussed in Ausubel (1995, supra, ch. 10 and 16). Purified GBAP obtained by these methods can be used directly in the assays shown in Examples XI and XV.

XI. Demonstration of GBAP Activity

35 GTP-binding activity of GBAP is determined in an assay that measures the binding of GBAP

to α - 32 P-labeled GTP. Purified GBAP is first blotted onto filters and rinsed in a suitable buffer. The filters are then incubated in buffer containing radiolabeled α - 32 P-GTP. The filters are washed in buffer to remove unbound GTP and counted in a radioisotope counter. Non-specific binding is determined in an assay that contains a 100-fold excess of unlabeled GTP. The amount of specific binding is

5 proportional to the activity of GBAP.

GTPase activity of GBAP is determined in an assay that measures the conversion of α - 32 P-GTP to α - 32 P-GDP. GBAP is incubated with α - 32 P-GTP in buffer for an appropriate period of time, and the reaction is terminated by heating or acid precipitation followed by centrifugation. An aliquot of the supernatant is subjected to polyacrylamide gel electrophoresis (PAGE) to separate GDP and GTP
10 together with unlabeled standards. The GDP spot is cut out and counted in a radioisotope counter. The amount of radioactivity recovered in GDP is proportional to GTPase activity of GBAP.

XII. Functional Assays

GBAP function is assessed by expressing the sequences encoding GBAP at physiologically elevated levels in mammalian cell culture systems. cDNA is subcloned into a mammalian expression
15 vector containing a strong promoter that drives high levels of cDNA expression. Vectors of choice include pCMV SPORT plasmid (Life Technologies) and pCR3.1 plasmid (Invitrogen), both of which contain the cytomegalovirus promoter. 5-10 μ g of recombinant vector are transiently transfected into a human cell line, for example, an endothelial or hematopoietic cell line, using either liposome formulations or electroporation. 1-2 μ g of an additional plasmid containing sequences encoding a
20 marker protein are co-transfected. Expression of a marker protein provides a means to distinguish transfected cells from nontransfected cells and is a reliable predictor of cDNA expression from the recombinant vector. Marker proteins of choice include, e.g., Green Fluorescent Protein (GFP; Clontech), CD64, or a CD64-GFP fusion protein. Flow cytometry (FCM), an automated, laser optics-based technique, is used to identify transfected cells expressing GFP or CD64-GFP and to evaluate the
25 apoptotic state of the cells and other cellular properties. FCM detects and quantifies the uptake of fluorescent molecules that diagnose events preceding or coincident with cell death. These events include changes in nuclear DNA content as measured by staining of DNA with propidium iodide; changes in cell size and granularity as measured by forward light scatter and 90 degree side light scatter; down-regulation of DNA synthesis as measured by decrease in bromodeoxyuridine uptake; alterations in
30 expression of cell surface and intracellular proteins as measured by reactivity with specific antibodies; and alterations in plasma membrane composition as measured by the binding of fluorescein-conjugated Annexin V protein to the cell surface. Methods in flow cytometry are discussed in Ormerod, M.G. (1994) Flow Cytometry, Oxford, New York NY.

The influence of GBAP on gene expression can be assessed using highly purified populations of
35 cells transfected with sequences encoding GBAP and either CD64 or CD64-GFP. CD64 and CD64-

GFP are expressed on the surface of transfected cells and bind to conserved regions of human immunoglobulin G (IgG). Transfected cells are efficiently separated from nontransfected cells using magnetic beads coated with either human IgG or antibody against CD64 (DYNAL, Lake Success NY). mRNA can be purified from the cells using methods well known by those of skill in the art. Expression
5 of mRNA encoding GBAP and other genes of interest can be analyzed by northern analysis or microarray techniques.

XIII. Production of GBAP Specific Antibodies

GBAP substantially purified using polyacrylamide gel electrophoresis (PAGE; see, e.g., Harrington, M.G. (1990) *Methods Enzymol.* 182:488-495), or other purification techniques, is used to
10 immunize rabbits and to produce antibodies using standard protocols.

Alternatively, the GBAP amino acid sequence is analyzed using LASERGENE software (DNASTAR) to determine regions of high immunogenicity, and a corresponding oligopeptide is synthesized and used to raise antibodies by means known to those of skill in the art. Methods for selection of appropriate epitopes, such as those near the C-terminus or in hydrophilic regions are well
15 described in the art. (See, e.g., Ausubel, 1995, *supra*, ch. 11.)

Typically, oligopeptides of about 15 residues in length are synthesized using an ABI 431A peptide synthesizer (PE Biosystems) using Fmoc chemistry and coupled to KLH (Sigma-Aldrich, St. Louis MO) by reaction with N-maleimidobenzoyl-N-hydroxysuccinimide ester (MBS) to increase immunogenicity. (See, e.g., Ausubel, 1995, *supra*.) Rabbits are immunized with the oligopeptide-KLH
20 complex in complete Freund's adjuvant. Resulting antisera are tested for antipeptide and anti-GBAP activity by, for example, binding the peptide or GBAP to a substrate, blocking with 1% BSA, reacting with rabbit antisera, washing, and reacting with radio-iodinated goat anti-rabbit IgG.

XIV. Purification of Naturally Occurring GBAP Using Specific Antibodies

Naturally occurring or recombinant GBAP is substantially purified by immunoaffinity
25 chromatography using antibodies specific for GBAP. An immunoaffinity column is constructed by covalently coupling anti-GBAP antibody to an activated chromatographic resin, such as CNBr-activated SEPHAROSE (Amersham Pharmacia Biotech). After the coupling, the resin is blocked and washed according to the manufacturer's instructions.

Media containing GBAP are passed over the immunoaffinity column, and the column is washed
30 under conditions that allow the preferential absorbance of GBAP (e.g., high ionic strength buffers in the presence of detergent). The column is eluted under conditions that disrupt antibody/GBAP binding (e.g., a buffer of pH 2 to pH 3, or a high concentration of a chaotrope, such as urea or thiocyanate ion), and GBAP is collected.

XV. Identification of Molecules Which Interact with GBAP

35 GBAP, or biologically active fragments thereof, are labeled with ¹²⁵I Bolton-Hunter reagent.

(See, e.g., Bolton A.E. and W.M. Hunter (1973) Biochem. J. 133:529-539.) Candidate molecules previously arrayed in the wells of a multi-well plate are incubated with the labeled GBAP, washed, and any wells with labeled GBAP complex are assayed. Data obtained using different concentrations of GBAP are used to calculate values for the number, affinity, and association of GBAP with the

5 candidate molecules.

Alternatively, molecules interacting with GBAP are analyzed using the yeast two-hybrid system as described in Fields, S. and O. Song (1989, Nature 340:245-246), or using commercially available kits based on the two-hybrid system, such as the MATCHMAKER system (Clontech).

GBAP may also be used in the PATHCALLING process (CuraGen Corp., New Haven CT)

10 which employs the yeast two-hybrid system in a high-throughput manner to determine all interactions between the proteins encoded by two large libraries of genes (Nandabalan, K. et al. (2000) U.S. Patent No. 6,057,101).

Various modifications and variations of the described methods and systems of the invention will

15 be apparent to those skilled in the art without departing from the scope and spirit of the invention. Although the invention has been described in connection with certain embodiments, it should be understood that the invention as claimed should not be unduly limited to such specific embodiments. Indeed, various modifications of the described modes for carrying out the invention which are obvious to those skilled in molecular biology or related fields are intended to be within the scope of the following

20 claims.

Table 1

Protein SEQ ID NO:	Nucleotide SEQ ID NO:	Clone ID	Library	Fragments
1	67	1405545	LATRTUT02	1405545F6 (LATRTUT02), 1405545H1 (LATRTUT02), 2926327F7 (TLYMNOT04), 2926327T6 (TLYMNOT04)
2	68	1451265	PENITUT01	700515X14 (SYNORAT03), 758541H1 (BRAITUT02), 1348685F6 (PROSNOT11), 1451265H1 (PENITUT01), 1872777F6 (LEUKNOT02)
3	69	1556311	BLADTUT04	1556311H1 (BLADTUT04), 3221281T6 (COLNNOT03), 3350311F6 (BRAITUT24), SBFA02256F1, SBFA01440F1, SBFA01098F1, SBFA04741F1
4	70	1901373	BLADTUT06	758057H1 (BRAITUT02), 1255886H1 (MENITUT03), 1887731X12C1 (BLADTUT07), 1901373H1 (BLADTUT06), 2866863H1 (KIDNNOT20), 3090943H1 (BRSTNOT19), 3215237H1 (TESTNOT07), 3719233H1 (PENCNOT10), 4319601H1 (BRADDIT02)
5	71	2367767	ADRENOT07	1331124F1 (PANCNOT07), 2367767H1 (ADRENOT07), 2367779F6 (ADRENOT07), 2782232F6 (BRSTNOT13), 3079286H2 (BRAIUNT01), 3584043T6 (293TF4T01), 4994696H1 (LIVRTUT11)
6	72	3090433	BRSTNOT19	312565H1 (LJUNGNOT02), 841829R6 (PROSTUT05), 1340809H1 (COLNTUT03), 1842057H1 (COLNNOT07), 2693513F6 (LJUNGNOT23), 3090433H1 (BRSTNOT19), 4895874H1 (LIVRTUT12)
7	73	3800591	SPLNNOT12	554715F1 (SCORNOT01), 882035X23 (THYRNOT02), 3042234F7 (BRSTNOT16), 3630695H1 (COLNNOT38), 3800591H1 (SPLNNOT12), 4975447H1 (HELATXT03)
8	74	5308471	MONOTXT02	790680R1 (PROSTUT03), 870507R1 (LUNGAST01), 948177R1 (PANCNOT05), 1682469T7 (PROSNOT15), 2897215H1 (KIDNTUT14), 5308471H1 (MONOTXT02)
9	75	5324322	FIBPFEN06	1001977R1 (BRSTNOT03), 1312045F1 (COLNFET02), 1334040F2 (COLNNOT13), 1488082F6 (UCMCL5T01), 1570077F1 (UTRSNOT05), 1929845H1 (COLNTUT03), 2306061H1 (NGANNOT01), 3127730F7 (LJUNGNOT12), 3494367H1 (ADRETUT07), 3578924H1 (293TF3T01), 4619513H1 (ENDVNOT01), 4932823H1 (BRSTTUT20), 5324322H1 (FIBPFEN06)
10	76	067184	HUVESTB01	067184H1 (HUVESTB01), 067184R1 (HUVESTB01), 067184X12 (HUVESTB01), 067184X23C1 (HUVESTB01), 067184X29C1 (HUVESTB01), 968551H1 (BRSTNOT05), 2611874T6 (LJUNGUT10)
11	77	722896	SYNCOAT01	722896H1 (SYNCOAT01), 722896X19C1 (SYNCOAT01), 1433775T1 (BEPINON01), 1477633T6 (CORPNOT02), 2676923F6 (KIDNNOT19), 3230945H1 (COTRNOT01), 3389989H1 (LJUNGUT17)
12	78	1571739	UTRSNOT05	1571739H1 (UTRSNOT05), 1571739X12R1 (UTRSNOT05), 2799982H1 (PENCNOT01), 4059114F6 (BRAIUNT21)

Table 1 (cont.)

Protein SEQ ID NO:	Nucleotide SEQ ID NO:	Clone ID	Library	Fragments
13	79	1739479	HIPONON01	511157H1 (MPHGN0T03), 511157T6 (MPHGN0T03), 1739479H1 (HIPONON01), 2092446T6 (PANCN0T04), 3880948F6 (SPLNN0T11)
14	80	1999147	BRSTTUT03	1339243T6 (COLNTUT03), 1999147H1 (BRSTTUT03), 2094940X11F1 (BRAITUT02), 2670959T6 (ESOGTUT02), 3297709H1 (TLYJINT01), 3396927H1 (UTRSN0T16), SCBA00828V1, SCBA00615V1, SCBA04422V1, SCBA04646V1, SCBA01715V1, 5544151H1 (TESTNOC01)
15	81	2182085	SININOT01	767764R6 (LUNGN0T04), 1655010F6 (PROSTUT08), 1701703T6 (BLADTUT05), 1871360F6 (SKINBIT01), 2081835F6 (UTRSN0T08), 2411644H1 (BSTMN0T02)
16	82	2216640	SINTFET03	489759H1 (HNT2AGT01), 2057454T6 (BEPINOT01), 2097739H1 (BRAITUT02), 2216640H1 (SINTFET03), 2325135H1 (OVARNOT02), 2361273R6 (LUNGFET05), 2667958H1 (ESOGTUT02), 3462348H1 (293TF2T01), 3478754H1 (OVARNOT11), 4163069F6 (BRSTN0T32)
17	83	2417361	HNT3AZT01	1394742F1 (THYRN0T03), 2417361F6 (HNT3AZT01), 2417361H1 (HNT3AZT01)
18	84	2454384	ENDANOT01	2454384H1 (ENDANOT01), 2454384T6 (ENDANOT01), 2589653T6 (LUNGN0T22), 2643485F6 (LUNGTUT08), 2723048H1 (LUNGTUT10), 3130367H1 (LUNGTUT12)
19	85	2610262	LUNGTUT08	1226946R6 (COLNNOT01), 1226946T6 (COLNNOT01), 2610262F6 (LUNGTUT08), 2610262H1 (LUNGTUT08)
20	86	2700075	OVARTUT10	604199R1 (BRSTTUT01), 1225126R1 (COLNTUT02), 1923323R6 (BRSTTUT01), 2301778R6 (BRSTN0T05), 2506882F6 (CONUTUT01), 2700075F6 (OVARTUT10), 2700075H1 (OVARTUT10), 2744960F6 (LUNGTUT11), 2833994F6 (TLYMN0T03), 2915413H1 (THYMFET03), 3647274H1 (ENDINOT01)
21	87	2786701	BRSTN0T13	754370R1 (BRAITUT02), 1426163R6 (BEPINON01), 1850667F6 (LUNGFET03), 1923562R6 (BRSTTUT01), 2215161F6 (SINTFET03), 2215161T6 (SINTFET03), 2498589H1 (ADRETUT05), 2991672F6 (KIDNFET02), 3028991H1 (HEARFET02), 3729514H1 (SMCCN0T03), 5065467H1 (ARTFTDT01)
22	88	3068538	UTRSNOR01	908465R2 (COLNNOT09), 957130R6 (KIDNNOT05), 1301520F6 (BRSTN0T07), 1580628H1 (DUODN0T01), 2631247F6 (COLNTUT15), 3068538H1 (UTRSNOR01), 3532286T6 (KIDNNOT25)
23	89	5159072	BRSTTWT02	412241R1 (BRSTN0T01), 660435H1 (BRAINOT03), 881160H1 (THYRN0T02), 1304119F6 (PLACN0T02), 1324073F1 (LPARN0T02), 2520427H1 (BRAITUT21), 5159072H1 (BRSTTWT02)

Table 1 (cont.)

Protein SEQ ID NO:	Nucleotide SEQ ID NO:	Clone ID	Library	Fragments
24	90	5519057	LIVRDIR01	066809H1 (HUVESB01), 3279230H1 (STOMFET02), 5370305F6 (BRAINT02), 5508943F6 (BRADDIR01), 5508943R6 (BRADDIR01), 5519057H1 (LIVRDIR01)
25	91	035379	HUVENOB01	035379H1 (HUVENOB01), 035379X11 (HUVENOB01), 035379X12 (HUVENOB01), 035379X13 (HUVENOB01), 035379X11D1 (HUVENOB01), 112161R1 (PITUNOT01), 192287R6 (BRSTTUT01), 2133108F6 (ENDCNOT01), 3107232H1 (BRSTTUT15), 4798135H1 (LIVRTUT09), SCHA01519V1, g1802757
26	92	275354	TESTNOT03	275354H1 (TESTNOT03), 275354X1 (TESTNOT03), 1663122T6 (BRSTNOT09), 2104284R6 (BRAITUT02), 2738788T6 (OVARNOT09), 3584082T6 (293TF4T01), SCGA07807V1
27	93	311658	LUNGNOT02	207452X12 (SPLNNOT02), 238306X85F1 (SINTNOT02), 264489H1 (HNT2AGT01), 311658H1 (LUNGNOT02), 1292829F6 (PGANNOT03), 1298271F1 (BRSTNOT07), 1488285H1 (UCMCL5T01), 2555757H1 (THYMNOT03), 2665984F6 (ADRENOT08), 2665984T6 (ADRENOT08), 3079209H1 (BRAIUNT01)
28	94	1251632	LUNGFET03	1251632H1 (LUNGFET03), 1251632X11 (LUNGFET03), 1251632X13 (LUNGFET03), 1316814T1 (BLADTUT02), 1384212F1 (BRAITUT08), 1711274F6 (PROSNOT16), 3128230H1 (LUNGUTUT12), 4819602H1 (PROSTUT17), SZZ00620R1
29	95	1331955	PANCNOT07	1363667X12 (LUNGNOT12), 1363667X13 (LUNGNOT12), SBBA01489F1, SBBA01528F1
30	96	1412614	BRAINT012	1412614F6 (BRAINT012), 1412614H1 (BRAINT012), 2278130H1 (PROSNON01), 2278130T6 (PROSNON01), 5105388T6 (PROSTUS19)
31	97	1750781	LIVRTUT01	452712T6 (TLYMNOT02), 483862R6 (HNT2RAT01), 777729R6 (COLNNOT05), 1394724F1 (THYRNOT03), 1652134F6 (PROSTUT08), 1750781F6 (LIVRTUT01), 1750781H1 (LIVRTUT01), 1750781X305F1 (LIVRTUT01), 1750781X307D2 (LIVRTUT01), 3221477H1 (COLNNON03), SCHA02984V1, SXAA02156D1, SXAA00802D1
32	98	1821658	GBLATUT01	909674H1 (STOMNOT02), 1579095F1 (DUODNOT01), 1821658H1 (GBLATUT01), 1821658T6 (GBLATUT01), 2508922F6 (CONUTUT01), 2584263H1 (BRAITUT22), 5571821H1 (TLYMNOT08)
33	99	1872574	LEUKNOT02	305990F1 (HEARNOT01), 908252R2 (COLNNOT09), 1872574H1 (LEUKNOT02), 2051868F6 (LIVRFET02), 2285632R6 (BRAINON01), 3181732F6 (TLYJNOT01), 3285854F6 (HEAONOT05), 3332012H1 (BRAIFET01), SBWA02751V1, SBWA02849V1, SBWA04744V1, SBWA00180V1

Table 1 (cont.)

Protein SEQ ID NO:	Nucleotide SEQ ID NO:	Clone ID	Library	Fragments
34	104	2590967	LUNGNOT22	1340471F6 (COLNUT03), 2590967F6 (LUNGNOT22), 2590967H1 (LUNGNOT22), 2771160F6 (COLANOT02), 3150287R6 (ADREN004)
35	101	2824491	ADRETUT06	1381834X14 (BRAITUT08), 1381834X16 (BRAITUT08), 1381834X17 (BRAITUT08), 1381834X31 (BRAITUT08), 1972345F6 (UCMCL5T01), 2824491H1 (ADRETUT06), 3413970H1 (PTHYNOT04)
36	102	2825460	ADRETUT06	870873R6 (LUNGAST01), 1440326F1 (THYRN0T03), 2825460H1 (ADRETUT06), 2825460T6 (ADRETUT06), 4154518H1 (MUSLTMT01), 5068209H1 (PANCNOT23), SBLA03097F1
37	103	2871116	THYRN0T10	357664R6 (PROSN0T01), 1419595F1 (KIDNNOT09), 1419595T1 (KIDNNOT09), 1577877F6 (LNODNOT03), 1577877T1 (LNODNOT03), 2767635H1 (COLANOT02), 2871116F6 (THYRN0T10), 2871116H1 (THYRN0T10), 4650546H1 (PROSTUT20), SBHA03160F1, SBHA02613F1, SBHA02703F1
38	104	2942212	CONNTUT05	1270807H1 (TESTTUT02), 1270807X301D1 (TESTTUT02), 1270807X309D2 (TESTTUT02), 2942212H2 (CONNTUT05), g1924758
39	105	3685151	HEAANOT01	850843R1 (BRAITUT03), 1932207F6 (COLNNOT16), 1932207T6 (COLNNOT16), 2210580F6 (SINTFET03), 3043060H1 (HEAANOT01), 3685151H1 (HEAANOT01), 4960825H1 (TLYNNOT05)
40	106	4881515	UTRMTMT01	925415R1 (BRAINOT04), 1337450F6 (COLNNOT13), 1961288R6 (BRSTN0T04), 3581069H1 (293TF3T01), 3583842T6 (293TF4T01), 4881515H1 (UTRMTMT01), 5488514H1 (DRGTN0N04), g1156606
41	107	5324681	FIBPFEN06	2455960T6 (ENDANOT01), 2458281F6 (ENDANOT01), 3834084F6 (PANCNOT17), 4046332H1 (LUNGNOT35), 5324681H1 (FIBPFEN06), g1733388, g1522074
42	108	5387651	BRAINOT19	810934T1 (LUNGNOT04), 822997R1 (KERANOT02), 1282647F1 (COLNNOT16), 1282647T1 (COLNNOT16), 1571430T6 (UTRSNOT05), 2208839F6 (SINTFET03), 2844787H1 (DRGLN0T01), 2908748H1 (THYMN0T05), 5387651H1 (BRAINOT19)
43	109	5595679	COLCDIT03	044292R6 (TBLYN0T01), 826501R1 (PROSN0T06), 1251632X12 (LUNGFET03), 1303934F1 (PLACNOT02), 1316814F1 (BLADTUT02), 1339567T1 (COLNUT03), 2806159H1 (BLADTUT08), 2837021H1 (TLYNNOT03), 3037493H1 (BRSTN0T16), 3119883H1 (LUNGITUT13), 3395946H1 (LUNGNOT28), 3748742H1 (UTRSNOT18)
44	110	5782457	BRAXNOT03	532593R6 (BRAINOT03), 532593T6 (BRAINOT03), 5782457H1 (BRAXNOT03)

Table 1 (cont.)

Protein SEQ ID No:	Nucleotide SEQ ID NO:	Clone ID	Library	Fragments
45	111	760677	BRAITUT02	745006X13 (BRAITUT01), 760677H1 (BRAITUT02), 760677X19 (BRAITUT02), 763135X12 (BRAITUT02), 946075H1 (RATRN02), 953938H1 (SCORN01)
46	112	1348567	PROSN011	1348567H1 (PROSN011), 1505075F6 (BRAITUT07), 1620627F6 (BRAITUT13), 2069105F6 (ISLTN01), 2417901F6 (HNT3AZT01), 2494683H1 (ADRETUT05), 3320166H1 (PROSBPT03)
47	113	1751354	LIVRTUT01	029909F1 (SPLNFET01), 029909R1 (SPLNFET01), 512371H1 (MPHGN0T03), 1439362F6 (PANCNOT08), 1751354F6 (LIVRTUT01), 1751354H1 (LIVRTUT01), 1900168F6 (BLADTUT06)
48	114	1976780	PANCUTUT02	001347H1 (U937NOT01), 1755035X307D2 (LIVRTUT01), 1976780H1 (PANCUTUT02), 2798389H1 (NPOLN0T01), 4050076H1 (SINTN0T18), 4228943H1 (BRAMDIT01), 4291877H1 (BRADDIRO1), 5514957H1 (BRADDIRO1), SCHAO4173V1, SCHAO2986V1, SCHAO1162V1, SCIA02096V1
49	115	2048234	LIVRFET02	1553355F6 (BLADTUT04), 1929455F6 (COLNUT03), 2048234H1 (LIVRFET02), 2699864T6 (OVARTUT10)
50	116	2111754	BRAITUT03	1335055F6 (COLNNT013), 2105233R6 (BRAITUT03), 2111754H1 (BRAITUT03), 2111754R6 (BRAITUT03), 3706377H1 (PENCNOT07)
51	117	2123286	BRSTN0T07	411359F1 (BRSTN0T01), 411359R1 (BRSTN0T01), 708105R6 (SYNORAT04), 1322780F6 (BLADN0T04), 2123286H1 (BRSTN0T07), 2719651F6 (LUNGUT01), 2880143F6 (UTRSTUT05), 3206153F6 (PENCNOT03), 3210501F6 (BLADN0T08), 3346625F6 (BRAITUT24), 3489118H1 (EPIGN0T01), 3605764H1 (LUNGNOT30), 4242993H1 (SYNWDIT01), 5089472H1 (UTRSTMR01)
52	118	2477507	SMCAN0T01	488096H1 (HNT2AGT01), 1672690F6 (BLADN0T05), 1802830F6 (COLNNT027), 1818538H1 (PROSN0T20), 2171841H1 (ENDCN0T03), 2477507H1 (SMCAN0T01), 3434030F6 (PENCNOT05)
53	119	2759119	THPIAZS08	496782H1 (HNT2NOT01), 1251166H1 (LUNGFET03), 1289067F1 (BRAIN0T1), 1295658T6 (PGANN0T03), 1510901F1 (LUNGNOT14), 1531583F1 (SPLNNT04), 1533488F1 (SPLNNT04), 1817447H1 (PROSN0T20), 2154846F6 (BRAIN0T09), 2468875H1 (THYRN0T08), 2498852F6 (ADRETUT05), 2506652F6 (CONUTUT01), 2630812F6 (COLNUT15), 2759119H1 (THPIAZS08), 2991227H1 (KIDNFET02), 3036646F6 (PENCNOT02), 3213032H1 (BLADN0T08)
54	120	2823818	ADRETUT06	618671R6 (PGANN0T01), 2823818H1 (ADRETUT06), 2950988F6 (KIDNFET01), g1679455

Table 1 (cont.)

Protein SEQ ID NO:	Nucleotide SEQ ID NO:	Clone ID	Library	Fragments
55	121	2859730	SININOT03	103901X6 (BMARNOT02), 510695H1 (MPHGNOT03), 1452088H1 (PENITUT01), 1527095F6 (UCMCL5T01), 2285371H1 (BRAINON01), 2843029H1 (DRGLNOT01), 2859730H1 (SININOT03)
56	122	2861155	SININOT03	875215T1 (LUNGAST01), 999673H1 (KIDNTUT01), 1425091R6 (BEPINON01), 2861155F6 (SININOT03), 2861155H1 (SININOT03), 2901915F6 (DRGCNOT01), 3621947H2 (ENDANOT03)
57	123	3002667	TYLNMNOT06	227882F1 (PANCNOT01), 227882R1 (PANCNOT01), 260725H1 (HNT2RAT01), 1432542R1 (BEPINON01), 2474761F6 (SMCANOT01), 3002667H1 (TYLNMNOT06), 3188977H1 (THYMNON04), 3461163H1 (293TF1T01), 4860339F6 (PROSTUT09)
58	124	3043734	HEAANOT01	3043734H1 (HEAANOT01), 3043734T6 (HEAANOT01), 3209823H1 (BLADNOT08), 5277071H1 (MUSLNOT01)
59	125	3294893	TYLJINT01	389234H1 (THYMNOT02), 1242886H1 (LUNGNOT03), 1539958T1 (SINTTUT01), 1870567H1 (SKINBIT01), 2069284F6 (ISLTNOT01), 2280217R6 (PROSNON01), 2353465T6 (LUNGNOT20), 2798990F6 (NPOLNOT01), 3180440H1 (TYLJNOT01), 3294893H1 (TYLJINT01), 3816962H1 (TONSNOT03), 5039889H2 (COLHTUT01), 5118831H1 (SMCBUNT01)
60	126	3349052	BRAITUT24	731775H1 (LUNGNOT03), 1449575H1 (PLACNOT02), 1899442F6 (BLADTUT06), 1967162T6 (BRSTNOT04), 2630025F6 (COLNTUT15), 2717821H1 (THYRNOT09), 3180478T6 (TYLJNOT01), 3349052H1 (BRAITUT24), 4523961F6 (HNT2TUT01), 5565623H1 (TYLNMNOT08), 6141909H1 (BMARTXT03)
61	127	3357264	PROSTUT16	2378150F6 (ISLTNOT01), 2378150X304B1 (ISLTNOT01), 2378150X304D1 (ISLTNOT01), 2807493F6 (BLADTUT08), 2881251F6 (UTRSTUT05), 3357264F6 (PROSTUT16), 3357264H1 (PROSTUT16), 3593272H1 (293TF5T01), 4163652T6 (BRSTNOT32), 4821588F6 (PROSTUT17), 4872125H1 (COLDNOT01)
62	128	3576329	BRONNOT01	1444072F6 (THYRNOT03), 1649584T6 (PROSTUT09), 1720770X15C1 (BLADNOT06), 1720770X16C1 (BLADNOT06), 2204612F6 (SPLNFET02), 3576329H1 (BRONNOT01), SAF001083F1
63	129	3805550	BLADTUT03	1416364F6 (BRAINOT12), 1553473H1 (BLADTUT04), 3232384H1 (COLNUCT03), 3287257H1 (HEAONOT05), 3539473H1 (SEMVNOT04), 3805550H1 (BLADTUT03)

Table 1 (cont.)

Protein SEQ ID NO:	Nucleotide SEQ ID NO:	Clone ID	Library	Fragments
64	130	4546403	COLXTDT01	1687704F6 (PROSTUT10), 1962744R6 (BRSTNOT04), 2674742F6 (KIDNNOT19), 4546403H1 (COLXTDT01), 4632828T6 (GBLADIT02)
65	131	4767318	BRATNOT02	134566R1 (BMARNOT02), 549352R1 (BEPINOT01), 1819757T6 (GBLATUT01), 2863295H1 (KIDNNOT20), 4767318H1 (BRATNOT02), SBLA03778F1, 93737930
66	132	4834527	BRAWNOT01	859906X38C1 (BRAITUT03), 1231225H1 (BRAITUT01), 1393681T6 (THYRNOT03), 1416996F6 (BRAINOT12), 2422475H1 (SCORNON02), 3999137R6 (HNT2AZS07), 4834527F6 (BRAWNOT01), 4834527H1 (BRAWNOT01), 5691642H1 (BRAUNOT02)

Table 2

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
1	269	S59 T71 T146 T211 T73 S127 T133 S216	N12	GTP-binding protein: D79-M234, Y80-C239 ATP/GTP binding site (P-loop): G102-S109	GTP-binding protein; Cgpa [Caulobacter crescentus] g3820578	BLAST-Genbank BLAST-DOMO MOTIFS
2	428	S59 S188 S200 S284 S367 S381 T399 T29 T193 T288 T354 S419		Beta transducin family, G-beta repeats: T269-L315, F261-D293 L280-V294, V185-V199 Signal peptide: M1-A35		ProfileScan MOTIFS BLIMPS-PRINTS HMMER-PFAM SPScan
3	562	S151 S152 T443 T444 S33 S104 S126 S127 S135 S216 S239 T350 T383 S450 T481 S146 T223 S287 S356 T434 T470 Y501	N125 N354 N445		Ras inhibitor [Homo sapiens] g190895	BLAST-Genbank
4	229	T108 S153 S9 S160 S215 T219 T142 S180	N111 N140 N198	ATP/GTP-binding site: G28-S35 Ras family: K23-T219 Ras transforming protein: V22-M43, A63-S85, P124-A137, L156-A178, D102-S145, K150-S180	Small GTP binding protein [Saccharomyces cerevisiae] g1171484	BLAST-Genbank MOTIFS HMMER-PFAM BLIMPS-BLOCKS BLIMPS-PRINTS BLAST-DOMO
5	360	T108 S360 S115 T217 T264 S295 S296 S35 S52 S160 S174 T206 T249	N149 N287 N327 N351	WD domain, G-beta repeats: M1-T64, M27-K41, F274-K306	Similar to WD domain, G-beta repeat protein [C. elegans] g3880929	BLAST-Genbank HMMER-PFAM ProfileScan BLIMPS-PRINTS
6	460	T18 T107 T123 S149 S199 S280 S336 S369 S71 T106 S387 Y302 Y400	N270 N350	Signal peptide: M1-A57	Rabin3 [Rattus norvegicus] g624225	BLAST-Genbank SPScan

Table 2 (cont.)

SEQ ID No:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
7	239	S234 S25 T47 T52 S98 T190 T206 S236 S223	N188	Phosducin: L20-I179, S25-I179, E30-D239	Phosducin-like protein [Homo sapiens] g4104075	BLAST-Genbank BLAST-PRODOM BLAST-PRODOM
8	334	T225 T235 S260 T4 S45 S63 S133 S162 S193 T279 T308		ATP/GTP-binding site (P-loop): G150-S157 GTP/OBG family: L75-D89, I146-Q166 G-protein, alpha subunit: I79-L87	GTP-binding protein homolog [L. braziliensis] g2570231	BLAST-Genbank MOTIFS BLIMPS-BLOCKS BLIMPS-PRINTS
9	341	S91 T122 S185 T199 T228 S65 T85 S323		Signal peptide: M1-A61 WD domain, G-beta repeats: L164-D196, C173-P217, V183-L197, S185-W195	Putative WD-40 repeat protein [Arabidopsis thaliana] g4191773	SPScan BLAST-Genbank MOTIFS ProfileScan HMMER-PFAM BLIMPS-BLOCKS BLIMPS-PRINTS
10	513	T29 T72 T109 S124 S136 S215 T341 T481 T501 S65 T245 T330 S338 T372 T386 S437 S451 T473 Y228 Y254	N242 N417	Beta-transducin family, G-beta repeats: F345-N377, K210-N242, E303-G335, S366-W376, N353-V400, L229-F243, I364-M378	Similar to WD domain G-beta repeats protein [C. elegans] g3875246	BLAST-Genbank MOTIFS HMMER-PFAM BLIMPS-BLOCKS BLIMPS-PRINTS ProfileScan
11	186	T61 S80 S107 S163 S31 T66 S183	N64 N148	ARF-family: N6-S186, P51-S90, M95-L149 GTP-binding, SAR1 protein: F78-K103, I123-I144 ATP/GTP binding site (P-loop): G27-T34	Similar to ADP- ribosylation factor [C. elegans] g3881189	BLAST-Genbank HMMER-PFAM BLIMPS-BLOCKS BLIMPS-PRINTS MOTIFS

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
12	204	S184 S203 S34 S152 T14 T20 T25 T62 S86		Ras family: K5-M189 Ras transforming protein: M1-E150, V4-T25, V113-L126 ATP/GTP binding site (P-loop): G10-S17	Ras-like protein, rit [Mus musculus] g1656005	BLAST-Genbank HMMER-PFAM BLIMPS-PRINTS BLAST-DOMO MOTIFS
13	100	S31 S46 T52 T61 S84 S4 S26 S27 T86		Beta-transducin, WD repeats: L81-M95, V70-S100, M1-S100	Similar to beta-transducin [C. elegans] g3875373; Alzheimer's disease protein [Homo sapiens] GeneSeq W21578	BLAST-Genbank MOTIFS BLIMPS-BLOCKS ProfileScan BLIMPS-PRINTS BLAST-PRODOM
14	795	T569 S776 S54 S188 S201 T248 T249 T298 S306 S368 T422 S466 T561 S586 S625 S678 T731 S777 S13 T42 S120 T134 T174 S213 S254 T266 S391 S415 S588 S620 S694 T742	N52 N421 N559 N585 N708	WD domain, G-beta repeats: L108-L139, L147-K179, T168-W178, Y227-K259, L126-N140, M166-A180	Phospholipase A2-activating protein [Rattus Norvegicus] g1017706	BLAST-Genbank BLAST-PRODOM BLAST-DOMO HMMER-PFAM BLIMPS-BLOCKS BLIMPS-PRINTS
15	393	S48 S61 T143 T334 T148 T200 S208 T212 T245 S266 S325	N182 N197	WD domain, G-beta repeats: L121-A153, L357-R389, P322-F369, L140-S154	Putative WD-repeat protein [Arabidopsis thaliana] g4263521	BLAST-Genbank HMMER-PFAM ProfileScan BLIMPS-PRINTS
16	485	S31 S108 S222 S321 S346 S357 T84 T125 T137 T151 T187 S227 T268 S395 T403 S409 T437 Y92 Y261		Beta-transducin, WD repeats: L129-L143, V219-T233, S262-W272, V387-G401, L429-V443, L452-G468	Notchless protein [Xenopus laevis] g3687833	BLAST-Genbank MOTIFS HMMER-PFAM ProfileScan BLIMPS-BLOCKS BLIMPS-PRINTS BLAST-DOMO BLAST-PRODOM

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
17	199	T32 T91 S177 T56 S153 S186 Y149		ATP/GTP-binding site (P-loop): G15-T22 Transforming protein, p21: L9-H30, T32-K48, I50-S72, Q115-L128, Y149-A171 Ras protein: K5-E151	Rab7 [Mus musculus] g1050551	BLAST-Genbank MOTIFS BLIMPS-PRINTS BLAST-PRODOM BLAST-DOMO
18	163	T18 T46 S120 S5 T151 T83 S125	N81 N159		Rhotekin [Mus musculus] g1293145	BLAST-Genbank
19	290	S56 S84 T234 S41 T91 T132 T234 T11 T47 T80 T194	N89 N188	Beta-transducin, WD-repeats: S41-W51, F195-D227, L238-N270, L214-I228, L257-M271, T203-S249	Similar to beta-transducin; [C. elegans] g3875373; Alzheimer's disease protein [Homo sapiens] GeneSeq W21578	BLAST-Genbank MOTIFS HMMER-PFAM BLIMPS-BLOCKS ProfileScan BLIMPS-PRINTS BLAST-PRODOM
20	705	T277 T364 S393 S448 S479 S483 T554 T568 S586 S239 S250 T374 S379 T398 S485 T528	N274	Beta-transducin, WD-repeats: L390-L404, L370-D403, L413-R445	Similar to WD domain G-beta repeat prot. [C. elegans] g3880340; 70kD tumor-specific antigen [R. norvegicus] g2505957	BLAST-Genbank HMMER-PFAM BLAST-PRODOM BLAST-DOMO BLIMPS-BLOCKS BLIMPS-PRINTS MOTIFS
21	454	T426 S451 S28 S51 T81 T89 T166 S214 T241 S264 T305 S343 S185 T193 S421	N58	ATP/GTP-binding site (P-loop): G73-S80 Cell division control protein: V47-P240	Similar to Drosophila melanogaster septin (sep2) [Homo sapiens] g1503988	BLAST-Genbank BLAST-PRODOM BLAST-DOMO MOTIFS
22	433	S169 T239 T292 S309 S382 S129 S297 Y60 Y101 Y315	N338	Protein GTPase activating protein: L8-S169 PH domain: Y138-Q355, Q191-I351, P210-E375	RhoGAP protein [Homo sapiens] g312212	BLAST-Genbank BLAST-PRODOM BLAST-DOMO

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
23	406	T83 S143 S303 T75 T115 T126 T211 S216 T289 T315 Y247	N184 N401 N402		Rab 9 effector, P40 [Homo sapiens] g2217970	BLAST-GenBank
24	229	S7 S127 T50 S178		ATP/GTP-binding site (P-loop): G40-T47 Ras family: K35-L217 Transforming protein, p21: F34-A55, R57-R73, V75-K97, N139-L152	Rab GTPase, Rab33B [Mus musculus] g2516239	BLAST-GenBank MOTIFS HMMER-PFAM BLIMPS-PRINTS BLAST-DOMO
25	670	T28 T45 S69 S3 S108 T277 S406 S6 T52 T82 S91 S102 S126 S609 S158 S197 T213 S217 T281 S323 S416 T419 T428 T474 S496 T540 S624 T664	N343	G-beta WD repeat domain: F386-D424, L411-T425, Y429-D465, L469-D504, L510-D545, L549-D585, K589-S629, M633-T669 Beta-transducin Trp-Asp repeats signature: C401-I447	Beta transducin- like protein [Podospira anserina] g607003	BLAST-GenBank BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS ProfileScan
26	445	T17 T48 T126 T160 T293 T364 T97 T132 S201 S217 S305 T322 S357 S434 Y339	N46 N95 N355	G-beta WD repeat domain: L62-N95, V82-L96, F124-M138, F297-V311 Beta-transducin Trp-Asp repeats signature: S316-A356 SOF1 protein, WD repeat: D129-V277, F309-V444	Beta-transducin [Schizosaccharomyc es pombe] g3393019	BLAST-GenBank BLAST-DOMO BLAST-PRODOM BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS
27	236	S24 S60 S86 T181 S117 S140		GYP7, GTPase activating protein: M1-I155	GTPase activating protein [Yarrowia lipolytica] g2370595	BLAST-GenBank BLAST-PRODOM MOTIFS

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
28	498	S97 T158 S247 S281 S425 S468 S494 T84 S176 T355 T474 Y239		G-beta WD repeat domain: L188-Q220, L446-G479, M466-P480 Beta-transducin Trp-Asp repeats signature: F200-A245	Similarity to guanine nucleotide binding protein [Caenorhabditis elegans] g3878300	BLAST-GenBank BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS ProfileScan
29	334	S63 S104 S148 S189 T208 S276 S50 T110 S118 T124 S152 T160 T237 T326	N265	G-beta WD repeat domain: L41-G73, I83-D115, L102-V116, L125-D157, L167-D199, I210-D242 Beta-transducin Trp-Asp repeats signature: S49-A308 Signal peptide: M1-A47	Similar to guanine nucleotide binding protein [Caenorhabditis elegans] g3874290	BLAST-GenBank BLAST-PRODROM BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS ProfileScan SPScan
30	292	S102 T145 S188 S52 T89 S204 S222 S283	N209	Protein with WD repeat: P7-W129 Signal peptide: M1-S68	F-box protein FBX16 [Mus musculus] g6456114	BLAST-PRODROM BLAST-GenBank MOTIFS SPScan
31	588	T184 T76 T137 S139 T161 T174 T183 S285 T351 T375 S432 T473 S488 S213 T265 S389 S394 T412 T546	N159	G-beta WD repeat domain: A293-E331, C337-T375, Y379-D417, I404-L418, E460-D497, T506-S543, G547-A586 Beta-transducin Trp-Asp repeats signature: A308-E354, L393-Q441	TipD (sequence similarity to Beta-transducin family) [Dictyostelium discoideum] g2407788	BLAST-GenBank BLAST-PRODROM BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS ProfileScan
32	326	T50 T84 S98 S142 T261 T65 T148 T178 T189 T221	N187	G-beta WD repeat domain: L120-N153, I140-L154		BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS
33	453	T157 T218 T248 S320 S347 S412 S7 T236 S290 T396 T406 Y63	N59 N225	G-beta WD repeat domain: D180-E211, A198-V212		BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
34	161	T137 T18 T102 Y96		DMR-N9 protein: K93-S148	DMR-N9 (homology to WD repeat sequences) [Mus musculus] g817954	BLAST-GenBank BLAST-PRODOM MOTIFS
35	684	T173 S25 S43 S74 S83 S127 S152 S154 S182 T316 T331 T341 S372 T535 T606 S623 T138 T151 S168 S238 S299 T336 T422 S476 T506 T530 T628 T647	N526 N621	ATP/GTP-binding site motif A (P-loop): G267 Elongation factor 1 alpha protein (GTP-binding) domain: D485-E684 Elongation factor Tu domain: K258-D658, N262-K273, M343-G374, R664-G677 GTP-binding elongation factors signature: A249-E420, N262-T275, K294-P346, T341-F351, T357-V368, L401-Q410, P443-I682 RAS transforming protein: K258-V439	eRFS (related to eukaryotic release factor 3) [Mus musculus] g4566435	BLAST-GenBank BLAST-PRODOM BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS ProfileScan
36	366	S342 T52 S71 T102 T119 T224 T324 T66 S195 S271 T353 Y225	N32	G-beta WD repeat domain: V146-L160, L284-I298 Signal Peptide: M1-T56		BLIMPS-PRINTS MOTIFS SPScan
37	339	S152 S183 T107 T115		Beta-transducin Trp-Asp repeats signature: N101-L162 Trp-Asp repeats-containing protein: R54-A172 Transmembrane domain: A300-I323	Hypothetical trp-asp repeats containing protein [Schizosaccharomyces pombe] g3850059	BLAST-GenBank BLAST-PRODOM HMMER MOTIFS

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
38	213	T29 T134 S153 T181 S200 T92 T129 S207		ATP/GTP-binding site motif A (P-loop): G15 GTP-binding protein signature (Arf1, Ran): W5-E179 Ras family signature: R10-C213 Transforming protein p21: F9-E30, R32-R48, E51-S73, Y114-L127, Y149-I171 Signal peptide: M1-V19	Rab-related GTP-binding protein [Homo sapiens] g1491714	BLAST-GenBank BLAST-DOMO BLAST-PRODOM BLIMPS-PRINTS HMMER-PFAM MOTIFS SPScan
39	393	S209 T363 S60 S99 S119 S135 T144 T147 S174 S210 T350 S359 S370 T371		G-beta WD repeat domain: G33-D69, K73-D110, L97-A111, W114-N152, L236-K276, I263-L277 Signal peptide: M1-T43	Similar to beta-transducin [Caenorhabditis elegans] g860695	BLAST-GenBank BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS SPScan
40	399	S86 T191 S219 S224 S254 S275 S308 S59 S72 T96 S373 S385 T394	N88 N106 N321 N322	ATP/GTP-binding site motif A (P-loop): G68 G-protein alpha subunit: R63-Q78 GTP-binding protein GTR1: A57-D294 Ras transforming protein: K61-L203	Gtr2 homolog, novel small GTPase subfamily [Schizosaccharomyces pombe] g3560242	BLAST-GenBank BLAST-DOMO BLAST-PRODOM BLIMPS-PRINTS MOTIFS
41	412	T106 S337 S391 S29 S30 S41 S130 S154 S207 S231 S326 S82 S97 T212 S220	N367	G-beta WD repeat domain: C184-E217, L204-Y218 Signal peptide: M1-G18	Putative transcriptional regulation protein, trp-asp repeat containing [Schizosaccharomyces pombe] g3766375	BLAST-GenBank BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS SPScan

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
42	163	S15 S17 S71 T114 Y49			Arf-like 2 binding protein BART1 [Homo sapiens] g4426962	BLAST-GenBank MOTIFS
43	514	S113 T174 S263 S297 S441 S484 S510 T100 S192 T371 T490 Y255		G-beta WD repeat domain: L204-Q236, L462-G495, M482-P496 Beta-transducin Trp-Asp repeats signature: F216-A261	Similarity to guanine nucleotide binding protein [Caenorhabditis elegans] g3878300	BLAST-GenBank BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS ProfileScan
44	67	T30 S15 Y18		G-protein gamma subunit: E2-L67, M9-R24, K10-P57, D45-G62 Prenyl group binding site (CAAX box): V64	G gamma protein [Mus musculus] g7259257	BLAST-GenBank BLIMPS-BLOCKS BLIMPS-PRINTS HMMER-PFAM MOTIFS
45	315	T148 S162 S209 S244 S252 S45 T48 S132 S140 S158 T214 S244	N79	WD40 domains/G-beta repeats: Q15-N53, G57-N95, G99-D137, P143-D179, G223-D263 WD/G-beta profiles: L71-Q116, T114-V161 WD/G-beta repeat signature: V250-L264	Contains similarity to G beta repeats (PROSITE:PS00670) of the beta- transducin family [Caenorhabditis elegans] g1086900	BLAST-GenBank MOTIFS ProfileScan HMMER-PFAM
46	504	T268 T99 T193 S323 S324 T409 T493 T91 T98 T133 T185 T234 T259 T264 T287 T337 S415 S498	N37 N295	WD40 domains/G-beta repeats: A211-D250, E254-S292, A296-A331, G338-D378, R382-D420 WD/G-beta profiles: T396-I442, T268-A316, C355-F400 WD/G-beta signatures: L407-L421, V279-V293 WD repeat protein-like region: I4-A226	Similar to S. cerevisiae PRP19 protein; similar to G-beta repeat region of guanine nucleotide binding protein [Caenorhabditis elegans] g727450	BLAST-GenBank BLAST-PRODROM MOTIFS BLIMPS-PRINTS ProfileScan HMMER-PFAM

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
47	522	S84 S315 S510 T20 S50 S57 S74 S116 S122 S128 S161 S185 T274 T300 S339 S345 S357 S367 T373 S459 T474 S136 S143 T174 S200 T300 S315 S356 S385 S420 T492	N226 N355		SAPK (stress activated protein kinase) interacting protein (similar to ras inhibitor) [Gallus gallus] g4929812	BLAST-GenBank MOTIFS
48	316	T109 S27 S86 S188 S7 S8 S82 T96 T105	N29 N136 N186	Pleckstrin homology (PH) domains: S3-N45, I59-Q301 RhoGAP domain: P140-N291 GTPase protein-like region: G125-L307	Beta2-chimaerin [Homo sapiens] g457230	BLAST-GenBank BLAST-PRODOM BLAST-DOMO HMMER-PFAM MOTIFS BLIMPS-PRINTS BLIMPS-PRODOM
49	387	S97 S199 T249 S342 S369 S382 T54 T182 T381		ATP/GTP-binding site motif (P-loop): G155-S162 GTP1/OBG GTP-binding protein family signatures: V151-A171, K172-I190, V200-G215, G217-D235 GTP-binding protein-like region: F15-P173 RAS transforming protein-like region: L145-L296	GTP-binding protein [Aquifex aeolicus] g2984292	BLAST-GenBank BLAST-PRODOM BLAST-DOMO BLIMPS-BLOCKS BLIMPS-PRINTS MOTIFS

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
50	334	T228 T308 S65 S91 T224 T228 T262 S34 S81 T224 T262 S286 T324	N108 N257 N322	ATP/GTP-binding site motif (P-loop): G149-S156 Ras domain: R144-M334 p21/ras-related transforming protein signatures: Y143-S164, N166-L182, H248-D261, F282-K304 Ras transforming protein-like region: I140-E284	NOEY2 putative tumor suppressor [Homo sapiens] g4100355	BLAST-GenBank BLAST-PRODOM BLAST-DOMO HMMER-PFAM BLIMPS-BLOCKS BLIMPS-PRINTS MOTIFS
51	551	T199 S38 T62 S85 T116 S169 S351 T379 S421 S422 S456 S12 S22 S150 T366 S383 T482 Y404 Y449	N133 N148 N179 N293 N296	Regulator of chromosome condensation (RCC1)/ guanine nucleotide dissociation stimulator domains: E117-S169, D170-D222, T223-D274, E275-G292, G328-G339 RCC1 signatures: V157-L167, V262-L272	UVB-resistance protein UVR8 [Arabidopsis thaliana] g5478530	BLAST-GenBank BLAST-PRODOM HMMER-PFAM PROFILES-SCAN BLIMPS-PRINTS MOTIFS
52	308	S152 T230 S266 S299 S19 S22 S240	N76	WD40 domains/G-beta repeats: Q33-R73, W79-T119, W126-K181, W188-T230, P241-K276, S11-A50 Sec13 related/WD repeat protein-like region: R73-I177 WD/G-beta profile: G11-A50	Sec13-related protein [Arabidopsis thaliana] g3150415	BLAST-GenBank HMMER-PFAM PROFILES-SCAN BLIMPS-PRINTS BLAST-PRODOM MOTIFS

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
53	949	S206 S514 T22 S216 T226 S273 T315 S663 T745 T908 T155 S232 S258 T350 S359 S472 S609 S776 S837 S913 Y682 Y862	N114	WD40 domains/G-beta repeats: V199-K237, V248-S284, G287-H326 Drosophila lethal(2) giant larvae tumor suppressor protein signature: K221-P244, A353-E377		HMER-PFAM BLIMPS-PRINTS MOTIFS
54	227	S11 T113 S173 T155 S173	N38	ATP/GTP-binding site motif (P-loop): G37-T44 Ras family domain: K32-C227 p21/ras-related transforming protein signatures: F31-D52, S54-K70, V72-T94, D134-M147, F169-I191 Ras transforming protein-like region: F27-T172	GTP-binding protein [Bos taurus] g162764	BLAST-GenBank HMER-PFAM BLIMPS-PRINTS BLAST-DOMO BLAST-PRODOM MOTIFS
55	474	T430 S98 S118 S309 S450 S463 T66 S130 T141 S241 S289 S309 S389 S450	N179 N185	WD40 domains/G-beta repeats: D70-Q109, T120-N159, E164-D202 G-beta repeat signature: L146-V160 WD repeat/coronin protein-like region: I208-Q467	Coronin-2 [Mus musculus] g4895039	BLAST-GenBank HMER-PFAM BLAST-PRODOM BLAST-DOMO MOTIFS
56	547	S16 T77 S85 S90 S112 S114 T132 S160 T166 T225 S248 S438 S491 S526 S125 S267 T299 T305 S504	N101 N110 N147 N297	WD40 domains/G-beta repeats: G159-N197, C312-A353, G357-D396 WD40/G-beta signatures: V245-A259, I428-T442	Guanine nucleotide-binding protein beta 5 [Mesocricetus auratus] g1001939	BLAST-GenBank HMER-PFAM BLIMPS-PRINTS MOTIFS

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
57	686	T331 S431 T637 S34 S169 S554 S28 S124 S192 S273 S341 T366 S426 S449 S470 S15 T2 S3 T24	N26 N44 N271 N424 N628	G-beta profile: S106-S152	Beta-transducin-like protein [Podospora anserina] g607003	BLAST-GenBank PROF-ILESCAN HMMER-PFAM
58	93				HP protein (RhoGAP ortholog) [Homo sapiens] g2559002	BLAST-GenBank MOTIFS
59	521	S63 S223 T64 T117 S147 S159 S195 S200 T214 S271 S401 S448 T49 S110 S195 T235 T280 T439	N71 N108 N381	Amino acyl tRNA ligase motif: P173-T183	GTPase activating protein [Schizosaccharomyces pombe] g3150248	BLAST-GenBank MOTIFS
60	751	T287 S543 T61 S275 S345 T430 T474 T565 T676 S705 S726 T727 S57 T63 T70 T287 S345 T389 T432 S458 T479 T518 T538	N344 N640	GTP binding elongation factor Tu family domain: E44-T530 Elongation factor G C-terminus domain: L556-T727 GTP binding elongation factor signatures: N48-T61, Q97-A105, N117-F127, R133-V144, F169-R178	Elongation factor G [Rattus norvegicus] g310102	BLAST-GenBank HMMER-PFAM BLIMPS-BLOCKS BLIMPS-PRINTS ProfileScan BLAST-PRODOM BLAST-DOMO MOTIFS
61	666	T492 S615 S619 T35 S142 T177 T212 S224 S270 T353 S403 T456 T471 T500 T550 S560 S572 T378 S403 S496 T509 T608 T611 T625	N75 N582		Rho target rhophilin [Mus musculus] g1176422	BLAST-GenBank MOTIFS

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
62	746	S22 T98 S571 T46 S53 S61 S66 S70 S71 T97 S14 S126 S127 T165 T184 T190 S249 S279 S323 S430 S519 S680 S736 S115 T190 T237 S349 S436 T444 S567 S598 S601 T613 S652 T741		WD40 domains/G-beta repeats: T403-E441, R570-H606, Q610-D648, T653-H691, L704-T746, C418-A461 G-beta repeat signature: L428-V442 Trp-Asp repeat protein-like region: S22-L407	Bop1 growth control protein [Mus musculus] g1679772	BLAST-GenBank BLAST-PRODOM BLAST-DOMO MOTIFS BLIMPS-PRINTS ProfileScan HMMER-PFAM
63	212	S105 S142 S148 S162 S167 S44 T56 T101 S162 S190	N131	ATP/GTP-binding site motif (P-loop): G25-T32 Ras family domain: K20-C212 ADP-ribosylation factor family domain: P6-R183 p21/ras-related transforming protein signatures: F19-T40, A42-K58, L60-T82, S122-L135, A158-L180 Ras transforming protein-like region: Y15-I155	Rab19 [Mus musculus] g2598565	BLAST-GenBank HMMER-PFAM BLIMPS-BLOCKS BLIMPS-PRINTS BLAST-DOMO BLAST-PRODOM MOTIFS

Table 2 (cont.)

SEQ ID NO:	Amino Acid Residues	Potential Phosphorylation Sites	Potential Glycosylation Sites	Signature Sequences, Motifs, and Domains	Homologous Sequences	Analytical Methods & Databases
64	307	T275 S276 T15 S25 T99 S164 S201 S6 S270 T293	N196 N291	WD40 domains/G-beta repeats: M1-I49, L60-D98, E102-Q140 sterile alpha motif (SAM): E161-R225 WD/G-beta signatures: L36-V50, L127-F141 G-beta profile: L74-P122	Hypothetical trp-asp repeats protein [C. elegans] SwissProt Q93847	BLAST- SwissProt HMMER-PFAM BLIMPS-PRINTS ProfileScan MOTIFS
65	378	S137 T167 T193 S202 S237 S276 S290 S310 S362 S82 T150 T158 T199 S362 T368		WD40 domains/G-beta repeats: H72-L110, L116-D155, L241-D279 G-beta profiles: S137-C175, S87-C133, I255-S312	WD repeat protein [Schizosaccharomyces pombe] g5701965	BLAST-GenBank HMMER-PFAM ProfileScan MOTIFS
66	466	S6 T24 S69 T209 S246 S357 T450 S181 S236 S242 T322 T407 T450	N448	RasGEF domain: V197-E397 Guanine nucleotide releasing protein-like region: P201-S432	Putative guanine-nucleotide releasing factor [Drosophila affinis] g2981229	BLAST-GenBank HMMER-PFAM BLAST-PRODOM BLAST-DOMO

Table 3

Nucleotide SEQ ID NO:	Selected Fragments	Tissue Expression (Fraction of Total)	Disease or Condition (Fraction of Total)	Vector
67	434-478	Cardiovascular (0.238) Reproductive (0.238) Hematopoietic/Immune (0.190)	Cancer (0.429) Inflammation/Trauma (0.524) Cell Proliferation (0.095)	pINCY
68	380-424 551-595	Nervous (0.185) Reproductive (0.167) Gastrointestinal (0.148)	Cancer (0.444) Cell Proliferation (0.315) Inflammation/Trauma (0.278)	pINCY
69	433-477	Reproductive (0.429) Nervous (0.142) Hematopoietic/Immune (0.142)	Cancer (0.714) Inflammation/Trauma (0.142)	pINCY
70	684-728	Reproductive (0.333) Nervous (0.178) Cardiovascular (0.111)	Cancer (0.467) Cell Proliferation (0.244) Inflammation/Trauma (0.267)	pINCY
71	219-263	Hematopoietic/Immune (0.257) Reproductive (0.229) Gastrointestinal (0.143)	Cell Proliferation (0.400) Inflammation/Trauma (0.429) Cancer (0.314)	pINCY
72	865-912	Gastrointestinal (0.286) Reproductive (0.286) Cardiovascular (0.238)	Cancer (0.667) Cell Proliferation (0.143) Inflammation/Trauma (0.238)	pINCY
73	900-944	Reproductive (0.229) Hematopoietic/Immune (0.157) Nervous (0.157)	Cancer (0.422) Inflammation/Trauma (0.349) Cell Proliferation (0.205)	pINCY
74	109-153 919-963	Reproductive (0.270) Gastrointestinal (0.162) Cardiovascular (0.135)	Cancer (0.405) Cell Proliferation (0.270) Inflammation/Trauma (0.324)	pINCY
75	1352-1396 1568-1612	Reproductive (0.296) Gastrointestinal (0.167) Nervous (0.167)	Cancer (0.509) Inflammation/Trauma (0.269) Cell Proliferation (0.157)	pINCY
76	541-585 1189-1233	Reproductive (0.238) Cardiovascular (0.190) Gastrointestinal (0.190)	Cancer (0.524) Inflammation/Trauma (0.310) Cell Proliferation (0.143)	PBLUESCRIPT
77	110-154	Reproductive (0.250) Nervous (0.224) Hematopoietic/Immune (0.132) Gastrointestinal (0.132)	Cancer (0.355) Inflammation/Trauma (0.342) Cell Proliferation (0.211)	PSPORT1
78	218-262	Reproductive (0.375) Nervous (0.188) Urologic (0.188)	Cancer (0.562) Inflammation/Trauma (0.250)	pINCY

Table 3 (cont.)

Nucleotide SEQ ID NO:	Selected Fragments	Tissue Expression (Fraction of Total)	Disease or Condition (Fraction of Total)	Vector
79	380-424	Hematopoietic/Immune (0.227) Nervous (0.227) Reproductive (0.227)	Inflammation/Trauma (0.636) Cancer (0.364)	PSPORT1
80	217-261	Reproductive (0.275) Gastrointestinal (0.196) Nervous (0.196)	Cancer (0.431) Inflammation/Trauma (0.451) Cell Proliferation (0.196)	PSPORT1
81	488-532 812-856	Reproductive (0.301) Nervous (0.151) Gastrointestinal (0.130)	Cancer (0.466) Inflammation/Trauma (0.288) Cell Proliferation (0.151)	pINCY
82	595-639	Reproductive (0.333) Developmental (0.148) Gastrointestinal (0.148)	Cancer (0.444) Cell Proliferation (0.370) Inflammation/Trauma (0.333)	pINCY
83	219-263	Hematopoietic/Immune (0.400) Gastrointestinal (0.200) Cardiovascular (0.100)	Inflammation/Trauma (0.429) Cell Proliferation (0.357) Cancer (0.286)	pINCY
84	164-208	Cardiovascular (0.667) Nervous (0.222) Hematopoietic/Immune (0.111)	Cancer (0.556) Cell Proliferation (0.111)	PBLUESCRIPT
85	487-531 757-801	Reproductive (0.182) Cardiovascular (0.091)	Cancer (0.308) Cell Proliferation (0.231) Inflammation/Trauma (0.154)	pINCY
86	325-369 811-855	Hematopoietic/Immune (0.288) Reproductive (0.197) Cardiovascular (0.136)	Inflammation (0.394) Cancer (0.318) Cell Proliferation (0.212)	pINCY
87	163-207	Reproductive (0.218) Nervous (0.172) Gastrointestinal (0.138)	Cancer (0.448) Cell Proliferation (0.218) Inflammation (0.207)	pINCY
88	362-406 758-802	Reproductive (0.273) Gastrointestinal (0.227) Cardiovascular (0.136) Musculoskeletal (0.136)	Cancer (0.681) Cell Proliferation (0.182) Inflammation/Trauma (0.318)	pINCY
89	272-316	Reproductive (0.229) Gastrointestinal (0.193) Nervous (0.193)	Cancer (0.404) Inflammation (0.220) Cell Proliferation (0.165)	pINCY

Table 3 (cont.)

Nucleotide SEQ ID NO:	Selected Fragments	Tissue Expression (Fraction of Total)	Disease or Condition (Fraction of Total)	Vector
90	98-142	Nervous (0.400) Cardiovascular (0.200) Developmental (0.200) Gastrointestinal (0.200)	Cell Proliferation (0.400) Inflammation (0.400) Cancer (0.200)	pINCY
91	384-428 2016-2060	Reproductive (0.221) Gastrointestinal (0.156) Hematopoietic/Immune (0.143)	Cancer (0.468) Inflammation/Trauma (0.325) Cell Proliferation (0.273)	PBLUESCRIPT
92	80-124 731-775	Reproductive (0.286) Hematopoietic/Immune (0.143) Nervous (0.143)	Cancer (0.469) Inflammation/Trauma (0.326) Cell Proliferation (0.306)	PBLUESCRIPT
93	437-481 641-685	Reproductive (0.250) Nervous (0.200) Cardiovascular (0.183)	Cancer (0.550) Inflammation/Trauma (0.284) Cell Proliferation (0.150)	PBLUESCRIPT
94	397-441 1036-1080	Reproductive (0.291) Hematopoietic/Immune (0.228) Nervous (0.152)	Inflammation/Trauma (0.468) Cancer (0.392) Cell Proliferation (0.165)	pINCY
95	247-291	Reproductive (0.242) Hematopoietic/Immune (0.121) Nervous (0.121) Urologic (0.121)	Cancer (0.455) Inflammation/Trauma (0.333) Cell Proliferation (0.273)	pINCY
96	453-497 858-902	Nervous (0.600) Reproductive (0.400)	Cancer (0.400) Inflammation/Trauma (0.200) Neurological (0.200)	pINCY
97	224-268 770-814 1211-1255	Gastrointestinal (0.262) Reproductive (0.215) Nervous (0.169)	Cancer (0.462) Inflammation/Trauma (0.339) Cell Proliferation (0.231)	pINCY
98	3-47 1086-1130	Reproductive (0.211) Gastrointestinal (0.211) Hematopoietic/Immune (0.158)	Cancer (0.553) Cell Proliferation (0.368) Inflammation/Trauma (0.342)	pINCY
99	388-432 874-918	Reproductive (0.268) Nervous (0.146) Cardiovascular (0.146)	Cancer (0.390) Inflammation/Trauma (0.390) Cell Proliferation (0.220)	pINCY
100	26-70	Gastrointestinal (0.238) Cardiovascular (0.190) Hematopoietic/Immune (0.143) Nervous (0.143) Endocrine (0.143)	Cancer (0.429) Inflammation/Trauma (0.381) Cell Proliferation (0.190)	pINCY

Table 3 (cont.)

Nucleotide SEQ ID NO:	Selected Fragments	Tissue Expression (Fraction of Total)	Disease or Condition (Fraction of Total)	Vector
101	226-270 2062-2106	Nervous (0.234) Hematopoietic/Immune (0.170) Reproductive (0.149)	Inflammation/Trauma (0.383) Cancer (0.362) Cell Proliferation (0.213)	pINCY
102	487-531	Reproductive (0.276) Nervous (0.161) Gastrointestinal (0.138) Cardiovascular (0.138)	Cancer (0.494) Cell Proliferation (0.310) Inflammation/Trauma (0.264)	pINCY
103	561-605	Reproductive (0.274) Gastrointestinal (0.194) Cardiovascular (0.129)	Cancer (0.452) Inflammation/Trauma (0.339) Cell Proliferation (0.258)	pINCY
104	287-331 806-850	Gastrointestinal (0.500) Reproductive (0.250) Musculoskeletal (0.250)	Cancer (0.500) Inflammation/Trauma (0.250)	pINCY
105	154-198 505-549 757-801	Gastrointestinal (0.233) Reproductive (0.209) Hematopoietic/Immune (0.163) Nervous (0.163)	Cancer (0.465) Inflammation/Trauma (0.326) Cell Proliferation (0.209)	pINCY
106	174-218 1182-1226	Reproductive (0.185) Hematopoietic/Immune (0.185) Nervous (0.185)	Inflammation/Trauma (0.352) Cell Proliferation (0.333) Cancer (0.315)	pINCY
107	120-164 489-533	Reproductive (0.231) Hematopoietic/Immune (0.231) Nervous (0.154) Cardiovascular (0.154)	Cell Proliferation (0.462) Inflammation/Trauma (0.385) Cancer (0.231)	pINCY
108	64-108 1738-1782	Nervous (0.277) Reproductive (0.255) Cardiovascular (0.160)	Cancer (0.362) Inflammation/Trauma (0.362) Cell Proliferation (0.149)	pINCY
109	415-459 1027-1071 1549-1593	Reproductive (0.274) Hematopoietic/Immune (0.226) Nervous (0.167)	Inflammation/Trauma (0.476) Cancer (0.393) Cell Proliferation (0.179)	pINCY
110	242-286	Reproductive (0.500) Nervous (0.500)	Cancer (1.000)	pINCY
111	488-541 1028-1081	Reproductive (0.270) Nervous (0.191) Gastrointestinal (0.126)	Cancer (0.507) Inflammation/Trauma (0.284) Cell Proliferation (0.172)	PSPORT1

Table 3 (cont.)

Nucleotide SEQ ID NO:	Selected Fragments	Tissue Expression (Fraction of Total)	Disease or Condition (Fraction of Total)	Vector
112	273-326 867-920 1299-1352	Reproductive (0.312) Nervous (0.281) Gastrointestinal (0.094)	Cancer (0.469) Inflammation/Trauma (0.328) Cell Proliferation (0.172)	pINCY
113	866-1135	Reproductive (0.245) Gastrointestinal (0.136) Nervous (0.136)	Cancer (0.445) Cell Proliferation (0.227) Inflammation/Trauma (0.327)	pINCY
114	155-325 812-1105	Nervous (0.314) Reproductive (0.275) Gastrointestinal (0.098)	Cancer (0.471) Inflammation/Trauma (0.118)	pINCY
115	14-298	Gastrointestinal (0.190) Nervous (0.190) Reproductive (0.190)	Cancer (0.476) Cell Proliferation (0.190) Inflammation/Trauma (0.238)	pINCY
116	41-235	Reproductive (0.400) Nervous (0.267) Musculoskeletal (0.133)	Cancer (0.600) Inflammation/Trauma (0.334) Cell Proliferation (0.067)	PSPORT1
117	379-432 973-1026 1297-1350	Reproductive (0.327) Nervous (0.184) Urologic (0.102)	Cancer (0.531) Cell Proliferation (0.224) Inflammation/Trauma (0.265)	pINCY
118	974-1465	Reproductive (0.231) Nervous (0.190) Gastrointestinal (0.169)	Cancer (0.446) Inflammation/Trauma (0.343) Cell Proliferation (0.226)	pINCY
119	543-1028	Reproductive (0.292) Nervous (0.163) Gastrointestinal (0.139)	Cancer (0.517) Cell Proliferation (0.167) Inflammation/Trauma (0.235)	PSPORT1
120	385-552	Nervous (0.571) Cardiovascular (0.143) Developmental (0.143)	Cancer (0.429) Inflammation/Trauma (0.572) Cell Proliferation (0.143)	pINCY
121	685-864	Nervous (0.300) Hematopoietic/Immune (0.200) Cardiovascular (0.140)	Cancer (0.340) Inflammation/Trauma (0.440) Cell Proliferation (0.200)	pINCY
122	703-1026	Reproductive (0.400) Cardiovascular (0.160) Nervous (0.160)	Cancer (0.680) Cell Proliferation (0.120) Inflammation/Trauma (0.160)	pINCY
123	830-1351	Reproductive (0.200) Cardiovascular (0.154) Hematopoietic/Immune (0.154)	Cancer (0.415) Cell Proliferation (0.277) Inflammation/Trauma (0.354)	pINCY

Table 3 (cont.)

Nucleotide SEQ ID NO:	Selected Fragments	Tissue Expression (Fraction of Total)	Disease or Condition (Fraction of Total)	Vector
124	272-325	Cardiovascular (0.250) Gastrointestinal (0.250) Musculoskeletal (0.250)	Inflammation/Trauma (0.750)	pINCY
125	130-972	Reproductive (0.180) Cardiovascular (0.160) Hematopoietic/Immune (0.160)	Cancer (0.440) Inflammation/Trauma (0.340) Cell Proliferation (0.220)	pINCY
126	434-973	Reproductive (0.188) Cardiovascular (0.156) Gastrointestinal (0.156)	Cancer (0.422) Inflammation/Trauma (0.328) Cell Proliferation (0.203)	pINCY
127	489-899	Gastrointestinal (0.333) Reproductive (0.333) Nervous (0.125)	Cancer (0.625) Inflammation/Trauma (0.208) Cell Proliferation (0.042)	pINCY
128	19-1242	Reproductive (0.354) Nervous (0.188) Gastrointestinal (0.146)	Cancer (0.562) Cell Proliferation (0.250) Inflammation/Trauma (0.250)	pINCY
129	217-270 541-594	Reproductive (0.364) Cardiovascular (0.182) Gastrointestinal (0.182)	Cancer (0.636) Inflammation/Trauma (0.364)	pINCY
130	115-864	Gastrointestinal (0.250) Hematopoietic/Immune (0.208) Nervous (0.208)	Cancer (0.500) Inflammation/Trauma (0.292)	pINCY
131	255-308	Reproductive (0.265) Nervous (0.169) Gastrointestinal (0.120)	Cancer (0.482) Cell Proliferation (0.349) Inflammation/Trauma (0.253)	pINCY
132	23-541	Nervous (0.909) Endocrine (0.091)	Cancer (0.636) Cell Proliferation (0.091) Inflammation/Trauma (0.182)	pINCY

Table 4

SEQ ID NO:	Library	Library Comment
67	LATRTUT02	Library was constructed using RNA isolated from a myxoma removed from the left atrium of a 43-year-old Caucasian male during annuloplasty. Pathology indicated atrial myxoma. Patient history included pulmonary insufficiency, acute myocardial infarction, atherosclerotic coronary artery disease, and hyperlipidemia. Family history included benign hypertension, acute myocardial infarction, atherosclerotic coronary artery disease, and type II diabetes.
68	PENITUT01	Library was constructed using RNA isolated from tumor tissue removed from the penis of a 64-year-old Caucasian male during penile amputation. Pathology indicated a fungating invasive grade 4 squamous cell carcinoma involving the inner wall of the foreskin and extending onto the glans penis. Patient history included benign neoplasm of the large bowel, atherosclerotic coronary artery disease, angina pectoris, gout, and obesity. Family history included malignant pharyngeal neoplasm, chronic lymphocytic leukemia, and chronic liver disease.
69	BLADTUT04	Library was constructed using RNA isolated from bladder tumor tissue removed from a 60-year-old Caucasian male during a radical cystectomy, prostatectomy, and vasectomy. Pathology indicated grade 3 transitional cell carcinoma in the left bladder wall. Carcinoma in-situ was identified in the dome and trigone. Family history included type I diabetes, a malignant neoplasm of the stomach, atherosclerotic coronary artery disease, and an acute myocardial infarction.
70	BLADTUT06	Library was constructed using RNA isolated from bladder tumor tissue removed from the posterior bladder wall of a 58-year-old Caucasian male during a radical cystectomy, radical prostatectomy, and gastrectomy. Pathology indicated grade 3 transitional cell carcinoma in the left lateral bladder wall. The remaining bladder showed marked cystitis with scattered microscopic foci of transitional cell carcinoma in situ. Patient history included angina and emphysema. Family history included acute myocardial infarction, atherosclerotic coronary artery disease, and type II diabetes.
71	ADRENOT07	Library was constructed using RNA isolated from adrenal tissue removed from a 61-year-old female during a bilateral adrenalectomy. Patient history included an unspecified disorder of the adrenal glands.
72	BRSTNOT19	Library was constructed using RNA isolated from breast tissue removed from a 67-year-old Caucasian female during a unilateral extended simple mastectomy. Pathology for the associated tumor tissue indicated residual invasive lobular carcinoma. Patient history included depressive disorder, benign large bowel neoplasm, and hemorrhoids. Family history included cerebrovascular and cardiovascular disease and lung cancer.

Table 4 (cont.)

SEQ ID NO:	Library	Library Comment
73	SPLNOT12	Library was constructed using RNA isolated from spleen tissue removed from a 65-year-old female. Pathology indicated the spleen was negative for metastasis. Pathology for the associated tumor tissue indicated well-differentiated neuroendocrine carcinoma (islet cell tumor), nuclear grade 1, forming a dominant mass in the distal pancreas. Multiple smaller tumor nodules were immediately adjacent to the main mass. The liver showed metastatic grade 1 islet cell tumor, forming multiple nodules. Multiple (4) pericholedochal lymph nodes contained metastatic grade 1 islet cell tumor.
74	MONOTXT02	Library was constructed using RNA isolated from treated monocytes from peripheral blood removed from a 42-year-old female. The cells were treated with interleukin-10 (IL-10) and lipopolysaccharide (LPS). IL-10 was added at time 0 at 10 ng/ml, LPS was added at 1 hour at 5 ng/ml. The monocytes were isolated from buffy coat by adherence to plastic. Incubation time was 24 hours.
75	FIBPFEN06	Library was constructed from 1.56 million independent clones from a prostate stromal fibroblast tissue library. Starting RNA was made from fibroblasts of prostate stroma removed from a male fetus, who died after 26 weeks' gestation. The libraries were normalized in two rounds using conditions adapted from Soares et al. (1994) Proc. Natl. Acad. Sci. USA 91:9228 and Bonaldo et al. (1996) Genome Research 6:791, except that a significantly longer (48-hours/round) reannealing hybridization was used.
76	HUVESTB01	Library was constructed using RNA isolated from shear-stressed HUV-EC-C (ATCC CRL 1730) cells. Before RNA isolation, the cells were subjected to a shear stress of 10 dynes/cm.
77	SYNOAT01	Library was constructed using RNA isolated from the knee synovial membrane tissue of an 82-year-old female with osteoarthritis.
78	UTRSNOT05	Library was constructed using RNA isolated from the uterine tissue of a 45-year-old Caucasian female during a total abdominal hysterectomy and total colectomy. Pathology for the associated tumor tissue indicated multiple leiomyomas of the myometrium and a grade 2 colonic adenocarcinoma of the cecum. Patient history included multiple sclerosis and mitral valve disorder. Family history included type I diabetes, cerebrovascular disease, atherosclerotic coronary artery disease, malignant skin neoplasm, hypertension, and malignant neoplasm of the colon.
79	HIPONON01	Library was constructed from 1.13 million independent clones from a hippocampus library. RNA was isolated from the hippocampus tissue of a 72-year-old Caucasian female who died from an intracranial bleed. Patient history included nose cancer, hypertension, and arthritis. The normalization and hybridization conditions were adapted from Soares et al. (1994) Proc. Natl. Acad. Sci. USA 91:9228.

Table 4 (cont.)

SEQ ID NO:	Library	Library Comment
80	BRSTTUT03	Library was constructed using RNA isolated from breast tumor tissue removed from a 58-year-old Caucasian female during a unilateral extended simple mastectomy. Pathology indicated multicentric invasive grade 4 lobular carcinoma. The mass was identified in the upper outer quadrant, and three separate nodules were found in the lower outer quadrant of the left breast. Patient history included skin cancer, rheumatic heart disease, osteoarthritis, and tuberculosis. Family history included cerebrovascular disease, coronary artery aneurysm, breast cancer, prostate cancer, atherosclerotic coronary artery disease, and type I diabetes.
81	SININOT01	Library was constructed using RNA isolated from ileum tissue obtained from the small intestine of a 4-year-old Caucasian female, who died from a closed head injury. Patient history included jaundice. Previous surgeries included a double hernia repair.
82	SINTFET03	Library was constructed using RNA isolated from small intestine tissue removed from a Caucasian female fetus, who died at 20 weeks' gestation.
83	HNT3AZT01	Library was constructed using RNA isolated from the hNT2 cell line (derived from a human teratocarcinoma that exhibited properties characteristic of a committed neuronal precursor). Cells were treated for three days with 0.35 micromolar 5-aza-2'-deoxycytidine (AZ).
84	ENDANOT01	Library was constructed using RNA isolated from aortic endothelial cell tissue from an explanted heart removed from a male during a heart transplant.
85	LUNGTTUT08	Library was constructed using RNA isolated from lung tumor tissue removed from a 63-year-old Caucasian male during a right upper lobectomy with fiberoptic bronchoscopy. Pathology indicated a grade 3 adenocarcinoma. Patient history included atherosclerotic coronary artery disease, an acute myocardial infarction, rectal cancer, an asymptomatic abdominal aortic aneurysm, tobacco abuse, and cardiac dysrhythmia. Family history included congestive heart failure, stomach cancer, and lung cancer, type II diabetes, atherosclerotic coronary artery disease, and an acute myocardial infarction.
86	OVARTUT10	Library was constructed using RNA isolated from ovarian tumor tissue removed from the left ovary of a 58-year-old Caucasian female during a total abdominal hysterectomy, removal of a solitary ovary, and repair of inguinal hernia. Pathology indicated a metastatic grade 3 adenocarcinoma of colonic origin, forming a partially cystic and necrotic tumor mass in the left ovary, and an adenocarcinoma of colonic origin, forming a nodule in the left mesovarium. A single intramural leiomyoma was identified in the myometrium. The cervix showed mild chronic cystic cervicitis. Patient history included benign hypertension, follicular cyst of the ovary, colon cancer, benign colon neoplasm, and osteoarthritis. Family history included emphysema, myocardial infarction, atherosclerotic coronary artery disease, benign hypertension, and hyperlipidemia.

Table 4 (cont.)

SEQ ID NO:	Library	Library Comment
87	BRSTNOT13	Library was constructed using RNA isolated from breast tissue removed from a 36-year-old Caucasian female during bilateral simple mastectomy. Patient history included a breast neoplasm, depressive disorder, hyperlipidemia, and a chronic stomach ulcer. Family history included cardiovascular and cerebrovascular disease; hyperlipidemia; skin, breast, esophageal, bladder, and bone cancer; and Hodgkin's lymphoma.
88	UTRSNOR01	Library was constructed using RNA isolated from uterine endometrium tissue removed from a 29-year-old Caucasian female during a vaginal hysterectomy and cystocele repair. Pathology indicated the endometrium was secretory, and the cervix showed mild chronic cervicitis with focal squamous metaplasia. Pathology for the associated tumor tissue indicated intramural uterine leiomyoma. Patient history included hypothyroidism, pelvic floor relaxation, and paraplegia. Family history included benign hypertension, type II diabetes, and hyperlipidemia.
89	BRSTTMT02	Library was constructed using RNA isolated from diseased right breast tissue removed from a 46-year-old Caucasian female during a unilateral extended simple mastectomy and open breast biopsy. Pathology indicated mildly proliferative fibrocystic change, including intraductal duct ectasia, papilloma formation, and ductal hyperplasia. Pathology for the associated tumor tissue indicated multifocal ductal carcinoma in situ, both comedo and non-comedo types, nuclear grade 2 with extensive intraductal calcifications. Patient history included deficiency anemia, normal delivery, chronic sinusitis, extrinsic asthma, and kidney infection. Family history included type II diabetes, benign hypertension, cerebrovascular disease, skin cancer, and hyperlipidemia.
90	LIVDIR01	Library was constructed using RNA isolated from diseased liver tissue removed from a 63-year-old Caucasian female during a liver transplant. Patient history included primary biliary cirrhosis. Serology was positive for anti-mitochondrial antibody.
91	HUVENOB01	Library was constructed using RNA isolated from HUV-EC-C (ATCC CRL 1730) cells.
92	TESTNOT03	Library was constructed using RNA isolated from testicular tissue removed from a 37-year-old Caucasian male, who died from liver disease. Patient history included cirrhosis, jaundice, and liver failure.
93	LUNGNOT02	Library was constructed using RNA isolated from the lung tissue of a 47-year-old Caucasian male, who died of a subarachnoid hemorrhage.
94	LUNGFET03	Library was constructed using RNA isolated from lung tissue removed from a Caucasian female fetus, who died at 20 weeks' gestation.
95	PANCNOT07	Library was constructed using RNA isolated from the pancreatic tissue of a Caucasian male fetus, who died at 23 weeks' gestation.

Table 4 (cont.)

SEQ ID NO:	Library	Library Comment
96	BRAINOT12	Library was constructed using RNA isolated from brain tissue removed from the right frontal lobe of a 5-year-old Caucasian male during a hemispherectomy. Pathology indicated extensive polymicrogyria and mild to moderate gliosis (predominantly subpial and subcortical), which are consistent with chronic seizure disorder. Family history included a cervical neoplasm.
97	LIVRTUT01	Library was constructed using RNA isolated from liver tumor tissue removed from a 51-year-old Caucasian female during a hepatic lobectomy. Pathology indicated metastatic grade 3 adenocarcinoma consistent with colon cancer. Family history included a malignant neoplasm of the liver.
98	GBLATUT01	Library was constructed using RNA isolated from gall bladder tumor tissue removed from a 78-year-old Caucasian female during a cholecystectomy. Pathology indicated invasive grade 2 squamous cell carcinoma, forming a mass in the gall bladder. Patient history included diverticulitis of the colon, palpitations, benign hypertension, and hyperlipidemia. Family history included a cholecystectomy, atherosclerotic coronary artery disease, hyperlipidemia, and benign hypertension.
99	LEUKNOT02	Library was constructed using RNA isolated from white blood cells of a 45-year-old female with blood type O+. The donor tested positive for cytomegalovirus (CMV).
100	LUNGNOT22	Library was constructed using RNA isolated from lung tissue removed from a 58-year-old Caucasian female. The tissue sample used to construct this library was found to have tumor contaminant upon microscopic examination. Pathology for the associated tumor tissue indicated a caseating granuloma. Family history included congestive heart failure, breast cancer, secondary bone cancer, acute myocardial infarction and atherosclerotic coronary artery disease.
101	ADRETUT06	Library was constructed using RNA isolated from adrenal tumor tissue removed from a 57-year-old Caucasian female during a unilateral right adrenalectomy. Pathology indicated pheochromocytoma, forming a nodular mass completely replacing the medulla of the adrenal gland.
102	ADRETUT06	Library was constructed using RNA isolated from adrenal tumor tissue removed from a 57-year-old Caucasian female during a unilateral right adrenalectomy. Pathology indicated pheochromocytoma, forming a nodular mass completely replacing the medulla of the adrenal gland.
103	THYRNOT10	Library was constructed using RNA isolated from diseased left thyroid tissue removed from a 30-year-old Caucasian female during a unilateral thyroid lobectomy and parathyroid reimplantation. Pathology indicated lymphocytic thyroiditis.

Table 4 (cont.)

SEQ ID NO:	Library	Library Comment
104	CONNTUT05	Library was constructed using RNA isolated from tumorous skull soft tissue removed from a 34-year-old Caucasian female during skull lesion excision. Pathology indicated grade 3 ependymoma forming an implant in the dermis and subcutis associated with dense fibrosis. Patient history included seizures, bone cancer, and brain cancer. Surgeries included cranioplasty and cerebral meninges lesion excision, and treatment included whole brain radiation. Family history included anxiety and depression.
105	HEAANOT01	Library was constructed using RNA isolated from right coronary and right circumflex coronary artery tissue removed from the explanted heart of a 46-year-old Caucasian male during a heart transplantation. Patient history included myocardial infarction from total occlusion of the left anterior descending coronary artery, atherosclerotic coronary artery disease, hyperlipidemia, myocardial ischemia, dilated cardiomyopathy, left ventricular dysfunction, and tobacco abuse. Family history included atherosclerotic coronary artery disease.
106	UTPMTMT01	Library was constructed using RNA isolated from myometrial tissue removed from a 45-year-old Caucasian female during vaginal hysterectomy and bilateral salpingo-oophorectomy. Pathology indicated the myometrium was negative for tumor. Pathology for the associated tumor tissue indicated multiple (23) subserosal, intramural, and submucosal leiomyomata. The endometrium was in proliferative phase. The right ovary contained an old corpus luteum. The cervix, left ovary, and right and left fallopian tubes were unremarkable. The patient presented with stress incontinence. Patient history included extrinsic asthma without status asthmaticus and normal delivery. Patient medications included Motrin, iron sulfate, Premarin, prednisone, Tylenol #3, and Colace. Family history included cerebrovascular disease, depression, and atherosclerotic coronary artery disease.
107	FIBPFEN06	This normalized library was constructed from 1.56 million independent clones from a prostate stromal fibroblast library. RNA was isolated from a male fetus, who died after 26 weeks' gestation. The normalization and hybridization conditions were adapted from Soares et al. (1994) Proc. Natl. Acad. Sci. USA 91:9228.

Table 4 (cont.)

SEQ ID NO:	Library	Library Comment
108	BRAINOT19	Library was constructed using RNA isolated from diseased brain tissue removed from the left frontal lobe of a 27-year-old Caucasian male during a brain lobectomy. Pathology indicated a focal deep white matter lesion, characterized by marked gliosis, calcifications, and hemosiderin-laden macrophages, consistent with a remote perinatal injury. This tissue also showed mild to moderate generalized gliosis, predominantly subpial and subcortical, consistent with chronic seizure disorder. The left temporal lobe, including the mesial temporal structures, showed focal, marked pyramidal cell loss and gliosis in hippocampal sector CA1, consistent with mesial temporal sclerosis. GFAP was positive for astrocytes. Patient presented with intractable epilepsy, focal epilepsy, hemiplegia, and an unspecified brain injury. Patient history included cerebral palsy, abnormality of gait, and depressive disorder. Family history included brain cancer.
109	COLCDIT03	Library was constructed using RNA isolated from diseased colon polyp tissue removed from the cecum of a 67-year-old female. Pathology indicated a benign cecum polyp. Pathology for the associated tumor tissue indicated invasive grade 3 adenocarcinoma that arose in tubulovillous adenoma forming a fungating mass in the cecum.
110	BRAXNOT03	Library was constructed using RNA isolated from sensory-motor cortex tissue removed from the brain of a 35-year-old Caucasian male who died from cardiac failure. Pathology indicated moderate leptomeningeal fibrosis and multiple microinfarctions of the cerebral neocortex. The cerebral hemisphere revealed moderate fibrosis of the leptomeninges with focal calcifications. There was evidence of shrunken and slightly eosinophilic pyramidal neurons throughout the cerebral hemispheres. There were also multiple small microscopic areas of cavitation with surrounding gliosis, scattered throughout the cerebral cortex. Patient history included dilated cardiomyopathy, congestive heart failure, cardiomegaly and an enlarged spleen and liver. Patient medications included simethicone, Lasix, Digoxin, Colace, Zantac, Captopril, and Vasotec.
111	BRAITUT02	Library was constructed using RNA isolated from brain tumor tissue removed from the frontal lobe of a 58-year-old Caucasian male during excision of a cerebral meningeal lesion. Pathology indicated a grade 2 metastatic hypernephroma. Patient history included a grade 2 renal cell carcinoma, insomnia, and chronic airway obstruction. Family history included a malignant neoplasm of the kidney.
112	PROSNOT11	Library was constructed using RNA isolated from the prostate tissue of a 28-year-old Caucasian male, who died from a self-inflicted gunshot wound.
113	LIVRTUT01	Library was constructed using RNA isolated from liver tumor tissue removed from a 51-year-old Caucasian female during a hepatic lobectomy. Pathology indicated metastatic grade 3 adenocarcinoma consistent with colon cancer. Family history included a malignant neoplasm of the liver.

Table 4 (cont.)

SEQ ID No.	Library	Library Comment
114	PANC TUT02	Library was constructed using RNA isolated from pancreatic tumor tissue removed from a 45-year-old Caucasian female during radical pancreaticoduodenectomy. Pathology indicated a grade 4 anaplastic carcinoma. Family history included benign hypertension, hyperlipidemia and atherosclerotic coronary artery disease.
115	LIVREFUT02	Library was constructed using RNA isolated from liver tissue removed from a Caucasian female fetus, who died at 20 weeks' gestation. Family history included seven days of erythromycin treatment for bronchitis in the mother during the first trimester.
116	BRAITUT03	Library was constructed using RNA isolated from brain tumor tissue removed from the left frontal lobe of a 17-year-old Caucasian female during excision of a cerebral meningeal lesion. Pathology indicated a grade 4 fibrillary glioma and small-cell astrocytoma. Family history included benign hypertension and cerebrovascular disease.
117	BRSTNOT07	Library was constructed using RNA isolated from diseased breast tissue removed from a 43-year-old Caucasian female during a unilateral extended simple mastectomy. Pathology indicated mildly proliferative fibrocystic changes with epithelial hyperplasia, papillomatosis, and duct ectasia. Pathology for the associated tumor tissue indicated invasive grade 4, nuclear grade 3 mammary adenocarcinoma with extensive comedo necrosis. Family history included epilepsy, cardiovascular disease, and type II diabetes.
118	SMCANOT01	Library was constructed using RNA isolated from an aortic smooth muscle cell line derived from the explanted heart of a male during a heart transplant.
119	THP1AZS08	Library was constructed using 5.76 million clones from a 5-aza-2'-deoxycytidine (AZ) treated THP-1 promonocyte cell line library. Starting RNA was made from THP-1 promonocyte cells treated for three days with 0.8 micromolar AZ. The hybridization probe for subtraction was derived from a similarly constructed library, made from 1 microgram of polyA RNA isolated from untreated THP-1 cells. 5.76 million clones from the AZ-treated THP-1 cell library were then subjected to two rounds of subtractive hybridization with 5 million clones from the untreated THP-1 cell library. Subtractive hybridization conditions were based on the methodologies of Swaroop et al. (1991) Nucleic Acids Res. 19:1954, and Bonaldo et al. (1996) Genome Research 6:791. THP-1 (ATCC TIB 202) is a human promonocyte line derived from peripheral blood of a 1-year-old Caucasian male with acute monocytic leukemia (ref: Int. J. Cancer (1980) 26:171).
120	ADRETUT06	Library was constructed using RNA isolated from adrenal tumor tissue removed from a 57-year-old Caucasian female during a unilateral right adrenalectomy. Pathology indicated pheochromocytoma, forming a nodular mass completely replacing the medulla of the adrenal gland.

Table 4 (cont.)

SEQ ID NO:	Library	Library Comment
121	SININOT03	Library was constructed using RNA isolated from ileum tissue obtained from an 8-year-old Caucasian female, who died from head trauma. Serology was positive for cytomegalovirus (CMV).
122	SININOT03	Library was constructed using RNA isolated from ileum tissue obtained from an 8-year-old Caucasian female, who died from head trauma. Serology was positive for cytomegalovirus (CMV).
123	TYMNOT06	Library was constructed using RNA isolated from activated Th2 cells. These cells were differentiated from umbilical cord CD4 T cells with IL-4 in the presence of anti-IL-12 antibodies and B7-transfected COS cells, and then activated for six hours with anti-CD3 and anti-CD28 antibodies.
124	HEANOT01	Library was constructed using RNA isolated from right coronary and right circumflex coronary artery tissue removed from the explanted heart of a 46-year-old Caucasian male during a heart transplantation. Patient history included myocardial infarction from total occlusion of the left anterior descending coronary artery, atherosclerotic coronary artery disease, hyperlipidemia, myocardial ischemia, dilated cardiomyopathy, left ventricular dysfunction, and tobacco abuse. Previous surgeries included cardiac catheterization. Family history included atherosclerotic coronary artery disease.
125	TYJJINT01	Library was constructed using RNA isolated from a Jurkat cell line derived from the T cells of a male. The cells were treated for 18 hours with 50 ng/ml phorbol ester (PMA) and 1 micromolar calcium ionophore. Patient history included acute T-cell leukemia.
126	BRAITUT24	Library was constructed using RNA isolated from right frontal brain tumor tissue removed from a 50-year-old Caucasian male during a cerebral meningioma lesion excision. Pathology indicated meningioma. Family history included colon cancer and cerebrovascular disease.
127	PROSTUT16	Library was constructed using RNA isolated from prostate tumor tissue removed from a 55-year-old Caucasian male. Pathology indicated adenocarcinoma, Gleason grade 5+4. Adenofibromatous hyperplasia was also present. The patient presented with elevated prostate specific antigen (PSA). Patient history included calculus of the kidney. Family history included lung cancer and breast cancer.
128	BRONNOT01	Library was constructed using RNA isolated from bronchial tissue removed from a 15-year-old Caucasian male.

Table 4 (cont.)

SEQ ID NO:	Library	Library Comment
129	BLADTUT03	Library was constructed using RNA isolated from bladder tumor tissue removed from a 58-year-old Caucasian male during a radical cystectomy, radical prostatectomy, regional lymph node excision, and urinary diversion to bowel. Pathology indicated invasive grade 3 transitional cell carcinoma. Patient history included a benign colon neoplasm. Family history included cerebrovascular disease and atherosclerotic coronary artery disease.
130	COLXTDT01	Library was constructed using RNA isolated from colon tissue removed from the appendix of a 37-year-old Black female during myomectomy, dilation and curettage, right fimbrial region biopsy, and incidental appendectomy. Pathology indicated an unremarkable appendix. Pathology for the associated tumor tissue indicated multiple (12) uterine leiomyomata. Patient history included premenopausal menorrhagia and sarcoidosis of the lung. Family history included acute myocardial infarction and atherosclerotic coronary artery disease.
131	BRATNOT02	Library was constructed using RNA isolated from superior temporal cortex tissue removed from the brain of a 35-year-old Caucasian male. No neuropathology was found. Patient history included dilated cardiomyopathy, congestive heart failure, and an enlarged spleen and liver.
132	BRAWNOT01	Library was constructed using RNA isolated from dentate nucleus tissue removed from the brain of a 35-year-old Caucasian male who died from cardiac failure. Pathology indicated moderate leptomenigeal fibrosis and multiple microinfarctions of the cerebral neocortex. Patient history included dilated cardiomyopathy, congestive heart failure, cardiomegaly, and an enlarged spleen and liver.

Table 5 (cont.)

Program	Description	Reference	Parameter Threshold
ProfileScan	An algorithm that searches for structural and sequence motifs in protein sequences that match sequence patterns defined in Prosite.	Gribskov, M. et al. (1988) CABIOS 4:61-66; Gribskov, M. et al. (1989) Methods Enzymol. 183:146-159; Bairoch, A. et al. (1997) Nucleic Acids Res. 25:217-221.	Normalized quality score > GCG-specified "HIGH" value for that particular Prosite motif. Generally, score = 1.4-2.1.
Phred	A base-calling algorithm that examines automated sequencer traces with high sensitivity and probability.	Ewing, B. et al. (1998) Genome Res. 8:175-185; Ewing, B. and P. Green (1998) Genome Res. 8:186-194.	
Phrap	A Phils Revised Assembly Program including SWAT and CrossMatch, programs based on efficient implementation of the Smith-Waterman algorithm, useful in searching sequence homology and assembling DNA sequences.	Smith, T.F. and M.S. Waterman (1981) Adv. Appl. Math. 2:482-489; Smith, T.F. and M.S. Waterman (1981) J. Mol. Biol. 147:195-197; and Green, P., University of Washington, Seattle, WA.	Score = 120 or greater; Match length = 56 or greater
Consed	A graphical tool for viewing and editing Phrap assemblies.	Gordon, D. et al. (1998) Genome Res. 8:195-202.	
SPScan	A weight matrix analysis program that scans protein sequences for the presence of secretory signal peptides.	Nielson, H. et al. (1997) Protein Engineering 10:1-6; Claverie, J.M. and S. Audic (1997) CABIOS 12:431-439.	Score = 3.5 or greater
Motifs	A program that searches amino acid sequences for patterns that matched those defined in Prosite.	Bairoch, A. et al. (1997) Nucleic Acids Res. 25:217-221; Wisconsin Package Program Manual, version 9, page M51-59, Genetics Computer Group, Madison, WI.	

What is claimed is:

1. An isolated polypeptide comprising an amino acid sequence selected from the group consisting of:

5 a) an amino acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, 10 SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, 15 SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, and SEQ ID NO:66,

b) a naturally occurring amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, 20 SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, 25 SEQ ID NO:50, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, and SEQ ID NO:66,

c) a biologically active fragment of an amino acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID 30 NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID 35 NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:52, SEQ ID

NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, and SEQ ID NO:66, and

d) an immunogenic fragment of an amino acid sequence selected from the group consisting
5 of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID
10 NO:33, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, and SEQ
15 ID NO:66.

2. An isolated polypeptide of claim 1 selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID
20 NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID
25 NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, and SEQ ID NO:66.

3. An isolated polynucleotide encoding a polypeptide of claim 1.
30

4. An isolated polynucleotide encoding a polypeptide of claim 2.

5. An isolated polynucleotide of claim 4 selected from the group consisting of SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID
35 NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID

NO:85, SEQ ID NO:86, SEQ ID NO:87, SEQ ID NO:88, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:95, SEQ ID NO:96, SEQ ID NO:97, SEQ ID NO:98, SEQ ID NO:99, SEQ ID NO:100, SEQ ID NO:102, SEQ ID NO:103, SEQ ID NO:104, SEQ ID NO:105, SEQ ID NO:106, SEQ ID NO:107, SEQ ID NO:109, SEQ ID NO:110, SEQ ID NO:111, SEQ ID NO:112, SEQ ID NO:113, SEQ ID NO:114, SEQ ID NO:115, SEQ ID NO:116, SEQ ID NO:118, SEQ ID NO:119, SEQ ID NO:120, SEQ ID NO:121, SEQ ID NO:122, SEQ ID NO:123, SEQ ID NO:124, SEQ ID NO:125, SEQ ID NO:126, SEQ ID NO:127, SEQ ID NO:128, SEQ ID NO:129, SEQ ID NO:130, SEQ ID NO:131, and SEQ ID NO:132.

10 6. A recombinant polynucleotide comprising a promoter sequence operably linked to a polynucleotide of claim 3.

7. A cell transformed with a recombinant polynucleotide of claim 6.

15 8. A transgenic organism comprising a recombinant polynucleotide of claim 6.

9. A method for producing a polypeptide of claim 1, the method comprising:

a) culturing a cell under conditions suitable for expression of the polypeptide, wherein said cell is transformed with a recombinant polynucleotide, and said recombinant polynucleotide
20 comprises a promoter sequence operably linked to a polynucleotide encoding the polypeptide of claim 1, and

b) recovering the polypeptide so expressed.

10. An isolated antibody which specifically binds to a polypeptide of claim 1.

25

11. An isolated polynucleotide comprising a polynucleotide sequence selected from the group consisting of:

a) a polynucleotide sequence selected from the group consisting of SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:86, SEQ ID NO:87, SEQ ID NO:88, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:95, SEQ ID NO:96, SEQ ID NO:97, SEQ ID NO:98, SEQ ID NO:99, SEQ ID NO:100, SEQ ID NO:102, SEQ ID NO:103, SEQ ID NO:104, SEQ ID NO:105, SEQ ID NO:106, SEQ ID NO:107, SEQ ID NO:109, SEQ ID NO:110, SEQ ID NO:111, SEQ ID NO:112, SEQ ID NO:113, SEQ ID NO:114, SEQ ID NO:115, SEQ ID NO:116, SEQ ID NO:118, SEQ ID NO:119,

SEQ ID NO:120, SEQ ID NO:121, SEQ ID NO:122, SEQ ID NO:123, SEQ ID NO:124, SEQ ID NO:125, SEQ ID NO:126, SEQ ID NO:127, SEQ ID NO:128, SEQ ID NO:129, SEQ ID NO:130, SEQ ID NO:131, and SEQ ID NO:132,

- b) a naturally occurring polynucleotide sequence having at least 70% sequence identity to a
 5 polynucleotide sequence selected from the group consisting of SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:86, SEQ ID NO:87, SEQ ID NO:88, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, SEQ
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 15 NO:126, SEQ ID NO:127, SEQ ID NO:128, SEQ ID NO:129, SEQ ID NO:130, SEQ ID NO:131, and SEQ ID NO:132,

- c) a polynucleotide sequence complementary to a),
 d) a polynucleotide sequence complementary to b), and
 e) an RNA equivalent of a)-d).

20

12. An isolated polynucleotide comprising at least 60 contiguous nucleotides of a polynucleotide of claim 11.

13. A method for detecting a target polynucleotide in a sample, said target polynucleotide
 25 having a sequence of a polynucleotide of claim 11, the method comprising:

- a) hybridizing the sample with a probe comprising at least 20 contiguous nucleotides comprising a sequence complementary to said target polynucleotide in the sample, and which probe specifically hybridizes to said target polynucleotide, under conditions whereby a hybridization complex is formed between said probe and said target polynucleotide or fragments thereof, and
 30 b) detecting the presence or absence of said hybridization complex, and, optionally, if present, the amount thereof.

14. A method of claim 13, wherein the probe comprises at least 60 contiguous nucleotides.

35 15. A method for detecting a target polynucleotide in a sample, said target polynucleotide having a sequence of a polynucleotide of claim 11, the method comprising:

- a) amplifying said target polynucleotide or fragment thereof using polymerase chain reaction amplification, and
- b) detecting the presence or absence of said amplified target polynucleotide or fragment thereof, and, optionally, if present, the amount thereof.

5

16. A composition comprising an effective amount of a polypeptide of claim 1 and a pharmaceutically acceptable excipient.

17. A composition of claim 16, wherein the polypeptide comprises an amino acid sequence
10 selected from the group consisting of SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID
NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID
NO:76, SEQ ID NO:77, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:80, SEQ ID NO:81, SEQ ID
NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:86, SEQ ID NO:87, SEQ ID
NO:88, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:95, SEQ ID
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NO:115, SEQ ID NO:116, SEQ ID NO:118, SEQ ID NO:119, SEQ ID NO:120, SEQ ID NO:121,
SEQ ID NO:122, SEQ ID NO:123, SEQ ID NO:124, SEQ ID NO:125, SEQ ID NO:126, SEQ ID
20 NO:127, SEQ ID NO:128, SEQ ID NO:129, SEQ ID NO:130, SEQ ID NO:131, and SEQ ID
NO:132.

18. A method for treating a disease or condition associated with decreased expression of
functional GBAP, comprising administering to a patient in need of such treatment the pharmaceutical
25 composition of claim 16.

19. A method for screening a compound for effectiveness as an agonist of a polypeptide of
claim 1, the method comprising:

- a) exposing a sample comprising a polypeptide of claim 1 to a compound, and
- b) detecting agonist activity in the sample.

30

20. A composition comprising an agonist compound identified by a method of claim 19 and
a pharmaceutically acceptable excipient.

21. A method for treating a disease or condition associated with decreased expression of
functional GBAP, comprising administering to a patient in need of such treatment a pharmaceutical
35

composition of claim 20.

22. A method for screening a compound for effectiveness as an antagonist of a polypeptide of claim 1, the method comprising:

- 5 a) exposing a sample comprising a polypeptide of claim 1 to a compound, and
 b) detecting antagonist activity in the sample.

23. A composition comprising an antagonist compound identified by a method of claim 22 and a pharmaceutically acceptable excipient.

10

24. A method for treating a disease or condition associated with overexpression of functional GBAP, comprising administering to a patient in need of such treatment a pharmaceutical composition of claim 23.

15 25. A method of screening for a compound that specifically binds to the polypeptide of claim 1, said method comprising the steps of:

- a) combining the polypeptide of claim 1 with at least one test compound under suitable conditions, and
 b) detecting binding of the polypeptide of claim 1 to the test compound, thereby identifying a
20 compound that specifically binds to the polypeptide of claim 1.

26. A method of screening for a compound that modulates the activity of the polypeptide of claim 1, said method comprising:

- a) combining the polypeptide of claim 1 with at least one test compound under conditions
25 permissive for the activity of the polypeptide of claim 1,
 b) assessing the activity of the polypeptide of claim 1 in the presence of the test compound, and
 c) comparing the activity of the polypeptide of claim 1 in the presence of the test compound with the activity of the polypeptide of claim 1 in the absence of the test compound, wherein a change
30 in the activity of the polypeptide of claim 1 in the presence of the test compound is indicative of a compound that modulates the activity of the polypeptide of claim 1.

27. A method for screening a compound for effectiveness in altering expression of a target polynucleotide, wherein said target polynucleotide comprises a sequence of claim 5, the method
35 comprising:

- a) exposing a sample comprising the target polynucleotide to a compound, and

b) detecting altered expression of the target polynucleotide.

28. A method for assessing toxicity of a test compound, said method comprising:

- a) treating a biological sample containing nucleic acids with the test compound;
- 5 b) hybridizing the nucleic acids of the treated biological sample with a probe comprising at least 20 contiguous nucleotides of a polynucleotide of claim 11 under conditions whereby a specific hybridization complex is formed between said probe and a target polynucleotide in the biological sample, said target polynucleotide comprising a polynucleotide sequence of a polynucleotide of claim 11 or fragment thereof;
- 10 c) quantifying the amount of hybridization complex; and
- d) comparing the amount of hybridization complex in the treated biological sample with the amount of hybridization complex in an untreated biological sample, wherein a difference in the amount of hybridization complex in the treated biological sample is indicative of toxicity of the test compound.

SEQUENCE LISTING

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 HILLMAN, Jennifer L.
 LAL, Preeti
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 REDDY, Roopa
 YANG, Junming
 BAUGHN, Mariah R.
 LU, Dyung Aina M.
 AZIMZAI, Yalda
 PATTERSON, Chandra

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	245	250	255
Asp Ala Gly Lys	Val Phe Lys Gly His	Arg Asn Gln Val Thr	Cys
	260	265	270
Leu Ser Val Ser	Thr Asp Gly Ser Val	Leu Leu Ser Gly Ser	His
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215 220 225
Gln Phe Met Thr Gln Val Lys Asn Tyr Leu Ser Gln Ser Ser Glu
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<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3090433CD1

<400> 6

Met Ala Asn Asp	Pro Leu Glu Gly Phe His	Glu Val Asn Leu Ala	
1	5	10	15
Ser Pro Thr Ser	Pro Asp Leu Leu Gly Val Tyr	Glu Ser Gly Thr	
	20	25	30
Gln Glu Gln Thr	Thr Ser Pro Ser Val Ile Tyr	Arg Pro His Pro	
	35	40	45
Ser Ala Leu Ser	Ser Val Pro Ile Gln Ala Asn	Ala Leu Asp Val	
	50	55	60
Ser Glu Leu Pro	Thr Gln Pro Val Tyr Ser	Ser Pro Arg Arg Leu	
	65	70	75
Asn Cys Ala Glu	Ile Ser Ser Ile Ser Phe His	Val Thr Asp Pro	
	80	85	90
Ala Pro Cys Ser	Thr Ser Gly Val Thr Ala Gly	Leu Thr Lys Leu	
	95	100	105
Thr Thr Arg Lys	Asp Asn Tyr Asn Ala Glu Arg	Glu Phe Leu Gln	
	110	115	120
Gly Ala Thr Ile	Thr Glu Ala Cys Asp Gly Ser	Asp Asp Ile Phe	
	125	130	135
Gly Leu Ser Thr	Asp Ser Leu Ser Arg Leu Arg	Ser Pro Ser Val	
	140	145	150
Leu Glu Val Arg	Glu Lys Gly Tyr Glu Arg	Leu Lys Glu Glu Leu	
	155	160	165
Ala Lys Ala Gln	Arg Glu Leu Lys Leu Lys Asp	Glu Glu Cys Glu	
	170	175	180
Arg Leu Ser Lys	Val Arg Asp Gln Leu Gly Gln	Glu Leu Glu Glu	
	185	190	195
Leu Thr Ala Ser	Leu Phe Glu Glu Ala His Lys	Met Val Arg Glu	
	200	205	210
Ala Asn Ile Lys	Gln Ala Thr Ala Glu Lys Gln	Leu Lys Glu Ala	
	215	220	225
Gln Gly Lys Ile	Asp Val Leu Gln Ala Glu Val	Ala Ala Leu Lys	
	230	235	240
Thr Leu Val Leu	Ser Ser Ser Pro Thr Ser	Pro Thr Gln Glu Pro	
	245	250	255
Leu Pro Gly Gly	Lys Thr Pro Phe Lys Lys Gly	His Thr Arg Asn	
	260	265	270
Lys Ser Thr Ser	Ser Ala Met Ser Gly Ser	His Gln Asp Leu Ser	

275	280	285
Val Ile Gln Pro	Ile Val Lys Asp Cys	Lys Glu Ala Asp Leu Ser
290	295	300
Leu Tyr Asn Glu	Phe Arg Leu Trp Lys	Asp Glu Pro Thr Met Asp
305	310	315
Arg Thr Cys Pro	Phe Leu Asp Lys Ile	Tyr Gln Glu Asp Ile Phe
320	325	330
Pro Cys Leu Thr	Phe Ser Lys Ser Glu	Leu Ala Ser Ala Val Leu
335	340	345
Glu Ala Val Glu	Asn Asn Thr Leu Ser	Ile Glu Pro Val Gly Leu
350	355	360
Gln Pro Ile Arg	Phe Val Lys Ala Ser	Ala Val Glu Cys Gly Gly
365	370	375
Pro Lys Lys Cys	Ala Leu Thr Gly Gln	Ser Lys Ser Cys Lys His
380	385	390
Arg Ile Lys Leu	Gly Asp Ser Ser Asn	Tyr Tyr Ile Ser Pro
395	400	405
Phe Cys Arg Tyr	Arg Ile Thr Ser Val	Cys Asn Phe Phe Thr Tyr
410	415	420
Ile Arg Tyr Ile	Gln Gln Gly Leu Val	Lys Gln Gln Asp Val Asp
425	430	435
Gln Met Phe Trp	Glu Val Met Gln Leu	Arg Lys Glu Met Ser Leu
440	445	450
Ala Lys Leu Gly	Tyr Phe Lys Glu Glu	Leu
455	460	

<210> 7

<211> 239

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3800591CD1

<400> 7

Met Gln Asp Pro	Asn Ala Asp Thr	Glu Trp Asn Asp	Ile Leu Arg
1	5	10	15
Lys Lys Gly Ile	Leu Pro Pro Lys	Glu Ser Leu Lys	Glu Leu Glu
20	25	30	35
Glu Glu Ala Glu	Glu Glu Gln Arg	Ile Leu Gln Gln	Ser Val Val
40	45	50	55
Lys Thr Tyr Glu	Asp Met Thr Leu	Glu Glu Leu Glu	Asp His Glu
60	65	70	75
Asp Glu Phe Asn	Glu Asp Glu Arg	Ala Ile Glu Met	Tyr Arg
80	85	90	95
Arg Arg Arg Leu	Ala Glu Trp Lys	Ala Thr Lys Leu	Lys Asn Lys
100	105	110	115
Phe Gly Glu Val	Leu Glu Ile Ser	Gly Lys Asp Tyr	Val Gln Glu
120	125	130	135
Val Thr Lys Ala	Gly Glu Gly Leu	Trp Val Ile Leu	His Leu Tyr
140	145	150	155
Lys Gln Gly Ile	Pro Leu Cys Ala	Leu Ile Asn Gln	His Leu Ser
160	165	170	175
Gly Leu Ala Arg	Lys Phe Pro Asp	Val Lys Phe Ile	Lys Ala Ile
180	185	190	195
Ser Thr Thr Cys	Ile Pro Asn Tyr	Pro Asp Arg Asn	Leu Pro Thr
200	205	210	215
Ile Phe Val Tyr	Leu Glu Gly Asp	Ile Lys Ala Gln	Phe Ile Gly
220	225	230	235
Pro Leu Val Phe	Gly Gly Met Asn	Leu Thr Arg Asp	Glu Leu Glu
240	245	250	255
Trp Lys Leu Ser	Glu Ser Gly Ala	Ile Met Thr Asp	Leu Glu Glu
260	265	270	275

Asn Pro Lys Lys Pro Ile Glu Asp Val Leu Leu Ser Ser Val Arg
 215 220 225
 Arg Ser Val Leu Met Lys Arg Asp Ser Asp Ser Glu Gly Asp
 230 235

<210> 8

<211> 334

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 5308471CD1

<400> 8

Met Arg Leu Thr Pro Arg Ala Leu Cys Ser Ala Ala Gln Ala Ala
 1 5 10 15
 Trp Arg Glu Asn Phe Pro Leu Cys Gly Arg Asp Val Ala Arg Trp
 20 25 30
 Phe Pro Gly His Met Ala Lys Gly Leu Lys Lys Met Gln Ser Ser
 35 40 45
 Leu Lys Leu Val Asp Cys Ile Ile Glu Val His Asp Ala Arg Ile
 50 55 60
 Pro Leu Ser Gly Arg Asn Pro Leu Phe Gln Glu Thr Leu Gly Leu
 65 70 75
 Lys Pro His Leu Leu Val Leu Asn Lys Met Asp Leu Ala Asp Leu
 80 85 90
 Thr Glu Gln Gln Lys Ile Met Gln His Leu Glu Gly Glu Gly Leu
 95 100 105
 Lys Asn Val Ile Phe Thr Asn Cys Val Lys Asp Glu Asn Val Lys
 110 115 120
 Gln Ile Ile Pro Met Val Thr Glu Leu Ile Gly Arg Ser His Arg
 125 130 135
 Tyr His Arg Lys Glu Asn Leu Glu Tyr Cys Ile Met Val Ile Gly
 140 145 150
 Val Pro Asn Val Gly Lys Ser Ser Leu Ile Asn Ser Leu Arg Arg
 155 160 165
 Gln His Leu Arg Lys Gly Lys Ala Thr Arg Val Gly Gly Glu Pro
 170 175 180
 Gly Ile Thr Arg Ala Val Met Ser Lys Ile Gln Val Ser Glu Arg
 185 190 195
 Pro Leu Met Phe Leu Leu Asp Thr Pro Gly Val Leu Ala Pro Arg
 200 205 210
 Ile Glu Ser Val Glu Thr Gly Leu Lys Leu Ala Leu Cys Gly Thr
 215 220 225
 Val Leu Asp His Leu Val Gly Glu Glu Thr Met Ala Asp Tyr Leu
 230 235 240
 Leu Tyr Thr Leu Asn Lys His Gln Arg Phe Gly Tyr Val Gln His
 245 250 255
 Tyr Gly Leu Gly Ser Ala Cys Asp Asn Val Glu Arg Val Leu Lys
 260 265 270
 Ser Val Ala Val Lys Leu Gly Lys Thr Gln Lys Val Lys Val Leu
 275 280 285
 Thr Gly Thr Gly Asn Val Asn Val Ile Gln Pro Asn Tyr Pro Ala
 290 295 300
 Ala Ala Arg Asp Phe Leu Gln Thr Phe Arg Arg Gly Leu Leu Gly
 305 310 315
 Ser Val Met Leu Asp Leu Asp Val Leu Arg Gly His Pro Pro Ala
 320 325 330
 Glu Thr Leu Pro

<210> 9

<211> 341

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 5324322CD1

<400> 9

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Met Glu Arg Ala Val Pro Leu Ala Val Pro Leu Gly Gln Thr Glu
 1          5          10          15
Val Phe Gln Ala Leu Gln Arg Leu His Met Thr Ile Phe Ser Gln
 20          25          30
Ser Val Ser Pro Cys Gly Lys Phe Leu Ala Ala Gly Asn Asn Tyr
 35          40          45
Gly Gln Ile Ala Ile Phe Ser Leu Ser Ser Ala Leu Ser Ser Glu
 50          55          60
Ala Lys Glu Glu Ser Lys Lys Pro Val Val Thr Phe Gln Ala His
 65          70          75
Asp Gly Pro Val Tyr Ser Met Val Ser Thr Asp Arg His Leu Leu
 80          85          90
Ser Ala Gly Asp Gly Glu Val Lys Ala Trp Leu Trp Ala Glu Met
 95          100         105
Leu Lys Lys Gly Cys Lys Glu Leu Trp Arg Arg Gln Pro Pro Tyr
110          115         120
Arg Thr Ser Leu Glu Val Pro Glu Ile Asn Ala Leu Leu Leu Val
125          130         135
Pro Lys Glu Asn Ser Leu Ile Leu Ala Gly Gly Asp Cys Gln Leu
140          145         150
His Thr Met Asp Leu Glu Thr Gly Thr Phe Thr Arg Val Leu Arg
155          160         165
Gly His Thr Asp Tyr Ile His Cys Leu Ala Leu Arg Glu Arg Ser
170          175         180
Pro Glu Val Leu Ser Gly Gly Glu Asp Gly Ala Val Arg Leu Trp
185          190         195
Asp Leu Arg Thr Ala Lys Glu Val Gln Thr Ile Glu Val Tyr Lys
200          205         210
His Glu Glu Cys Ser Arg Pro His Asn Gly Arg Trp Ile Gly Cys
215          220         225
Leu Ala Thr Asp Ser Asp Trp Met Val Cys Gly Gly Gly Pro Ala
230          235         240
Leu Thr Leu Trp His Leu Arg Ser Ser Thr Pro Thr Thr Ile Phe
245          250         255
Pro Ile Arg Ala Pro Gln Lys His Val Thr Phe Tyr Gln Asp Leu
260          265         270
Ile Leu Ser Ala Gly Gln Gly Arg Cys Val Asn Gln Trp Gln Leu
275          280         285
Ser Gly Glu Leu Lys Ala Gln Val Pro Gly Ser Ser Pro Gly Leu
290          295         300
Leu Ser Leu Ser Leu Asn Gln Gln Pro Ala Ala Pro Glu Cys Lys
305          310         315
Val Leu Thr Ala Ala Gly Asn Ser Cys Arg Val Asp Val Phe Thr
320          325         330
Asn Leu Gly Tyr Arg Ala Phe Ser Leu Ser Phe
335          340

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<210> 10

<211> 513

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 067184CD1

<400> 10

Met	Ser	Ile	Glu	Ile	Glu	Ser	Ser	Asp	Val	Ile	Arg	Leu	Ile	Met
1				5					10					15
Gln	Tyr	Leu	Lys	Glu	Asn	Ser	Leu	His	Arg	Ala	Leu	Ala	Thr	Leu
				20					25					30
Gln	Glu	Glu	Thr	Thr	Val	Ser	Leu	Asn	Thr	Val	Asp	Ser	Ile	Glu
				35					40					45
Ser	Phe	Val	Ala	Asp	Ile	Asn	Ser	Gly	His	Trp	Asp	Thr	Val	Leu
				50					55					60
Gln	Ala	Ile	Gln	Ser	Leu	Lys	Leu	Pro	Asp	Lys	Thr	Leu	Ile	Asp
				65					70					75
Leu	Tyr	Glu	Gln	Val	Val	Leu	Glu	Leu	Ile	Glu	Leu	Arg	Glu	Leu
				80					85					90
Gly	Ala	Ala	Arg	Ser	Leu	Leu	Arg	Gln	Thr	Asp	Pro	Met	Ile	Met
				95					100					105
Leu	Lys	Gln	Thr	Gln	Pro	Glu	Arg	Tyr	Ile	His	Leu	Glu	Asn	Leu
				110					115					120
Leu	Ala	Arg	Ser	Tyr	Phe	Asp	Pro	Arg	Glu	Ala	Tyr	Pro	Asp	Gly
				125					130					135
Ser	Ser	Lys	Glu	Lys	Arg	Arg	Ala	Ala	Ile	Ala	Gln	Ala	Leu	Ala
				140					145					150
Gly	Glu	Val	Ser	Val	Val	Pro	Pro	Ser	Arg	Leu	Met	Ala	Leu	Leu
				155					160					165
Gly	Gln	Ala	Leu	Lys	Trp	Gln	Gln	His	Gln	Gly	Leu	Leu	Pro	Pro
				170					175					180
Gly	Met	Thr	Ile	Asp	Leu	Phe	Arg	Gly	Lys	Ala	Ala	Val	Lys	Asp
				185					190					195
Val	Glu	Glu	Glu	Lys	Phe	Pro	Thr	Gln	Leu	Ser	Arg	His	Ile	Lys
				200					205					210
Phe	Gly	Gln	Lys	Ser	His	Val	Glu	Cys	Ala	Arg	Phe	Ser	Pro	Asp
				215					220					225
Gly	Gln	Tyr	Leu	Val	Thr	Gly	Ser	Val	Asp	Gly	Phe	Ile	Glu	Val
				230					235					240
Trp	Asn	Phe	Thr	Thr	Gly	Lys	Ile	Arg	Lys	Asp	Leu	Lys	Tyr	Gln
				245					250					255
Ala	Gln	Asp	Asn	Phe	Met	Met	Met	Asp	Asp	Ala	Val	Leu	Cys	Met
				260					265					270
Cys	Phe	Ser	Arg	Asp	Thr	Glu	Met	Leu	Ala	Thr	Gly	Ala	Gln	Asp
				275					280					285
Gly	Lys	Ile	Lys	Val	Trp	Lys	Ile	Gln	Ser	Gly	Gln	Cys	Leu	Arg
				290					295					300
Arg	Phe	Glu	Arg	Ala	His	Ser	Lys	Gly	Val	Thr	Cys	Leu	Ser	Phe
				305					310					315
Ser	Lys	Asp	Ser	Ser	Gln	Ile	Leu	Ser	Ala	Ser	Phe	Asp	Gln	Thr
				320					325					330
Ile	Arg	Ile	His	Gly	Leu	Lys	Ser	Gly	Lys	Thr	Leu	Lys	Glu	Phe
				335					340					345
Arg	Gly	His	Ser	Ser	Phe	Val	Asn	Glu	Ala	Thr	Phe	Thr	Gln	Asp
				350					355					360
Gly	His	Tyr	Ile	Ile	Ser	Ala	Ser	Ser	Asp	Gly	Thr	Val	Lys	Ile
				365					370					375
Trp	Asn	Met	Lys	Thr	Thr	Glu	Cys	Ser	Asn	Thr	Phe	Lys	Ser	Leu
				380					385					390
Gly	Ser	Thr	Ala	Gly	Thr	Asp	Ile	Thr	Val	Asn	Ser	Val	Ile	Leu
				395					400					405
Leu	Pro	Lys	Asn	Pro	Glu	His	Phe	Val	Val	Cys	Asn	Arg	Ser	Asn
				410					415					420
Thr	Val	Val	Ile	Met	Asn	Met	Gln	Gly	Gln	Ile	Val	Arg	Ser	Phe
				425					430					435
Ser	Ser	Gly	Lys	Arg	Glu	Gly	Gly	Asp	Phe	Val	Cys	Cys	Ala	Leu
				440					445					450
Ser	Pro	Arg	Gly	Glu	Trp	Ile	Tyr	Cys	Val	Gly	Glu	Asp	Phe	Val
				455					460					465
Leu	Tyr	Cys	Phe	Ser	Thr	Val	Thr	Gly	Lys	Leu	Glu	Arg	Thr	Leu

	470		475		480
Thr Val His Glu Lys Asp Val Ile Gly Ile Ala His His Pro His					
	485		490		495
Gln Asn Leu Ile Ala Thr Tyr Ser Glu Asp Gly Leu Leu Lys Leu					
	500		505		510

Trp Lys Pro

<210> 11

<211> 186

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 722896CD1

<400> 11

Met Ile Ala Leu Phe Asn Lys Leu Leu Asp Trp Phe Lys Ala Leu	
1 5 10 15	
Phe Trp Lys Glu Glu Met Glu Leu Thr Leu Val Gly Leu Gln Tyr	
20 25 30	
Ser Gly Lys Thr Thr Phe Val Asn Val Ile Ala Ser Gly Gln Phe	
35 40 45	
Asn Glu Asp Met Ile Pro Thr Val Gly Phe Asn Met Arg Lys Ile	
50 55 60	
Thr Lys Gly Asn Val Thr Ile Lys Leu Trp Asp Ile Gly Gly Gln	
65 70 75	
Pro Arg Phe Arg Ser Met Trp Glu Arg Tyr Cys Arg Gly Val Ser	
80 85 90	
Ala Ile Val Tyr Met Val Asp Ala Ala Asp Gln Glu Lys Ile Glu	
95 100 105	
Ala Ser Lys Asn Glu Leu His Asn Leu Leu Asp Lys Pro Gln Leu	
110 115 120	
Gln Gly Ile Pro Val Leu Val Leu Gly Asn Lys Arg Asp Leu Pro	
125 130 135	
Gly Ala Leu Asp Glu Lys Glu Leu Ile Glu Lys Met Asn Leu Ser	
140 145 150	
Ala Ile Gln Asp Arg Glu Ile Cys Cys Tyr Ser Ile Ser Cys Lys	
155 160 165	
Glu Lys Asp Asn Ile Asp Ile Thr Leu Gln Trp Leu Ile Gln His	
170 175 180	
Ser Lys Ser Arg Arg Ser	
185	

<210> 12

<211> 204

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1571739CD1

<400> 12

Met Asn Asp Val Lys Leu Ala Val Leu Gly Gly Glu Gly Thr Gly	
1 5 10 15	
Lys Ser Ala Leu Thr Val Arg Phe Leu Thr Lys Arg Phe Ile Gly	
20 25 30	
Glu Tyr Ala Ser Asn Phe Glu Ser Ile Tyr Lys Lys His Leu Cys	
35 40 45	
Leu Glu Arg Lys Gln Leu Asn Leu Glu Ile Tyr Asp Pro Cys Ser	
50 55 60	
Gln Thr Gln Lys Ala Lys Phe Ser Leu Thr Ser Glu Leu His Trp	
65 70 75	

Ala Asp Gly Phe Val Ile Val Tyr Asp Ile Ser Asp Arg Ser Ser
80 85 90
Phe Ala Phe Ala Lys Ala Leu Ile Tyr Arg Ile Arg Glu Pro Gln
95 100 105
Thr Ser His Cys Lys Arg Ala Val Glu Ser Ala Val Phe Leu Val
110 115 120
Gly Asn Lys Arg Asp Leu Cys His Val Arg Glu Val Gly Trp Glu
125 130 135
Glu Gly Gln Lys Leu Ala Leu Glu Asn Arg Cys Gln Phe Cys Glu
140 145 150
Leu Ser Ala Ala Glu Gln Ser Leu Glu Val Glu Met Met Phe Ile
155 160 165
Arg Ile Ile Lys Asp Ile Leu Ile Asn Phe Lys Leu Lys Glu Lys
170 175 180
Arg Arg Pro Ser Gly Ser Lys Ser Met Ala Lys Leu Ile Asn Asn
185 190 195
Val Phe Gly Lys Arg Arg Lys Ser Val
200

<210> 13

<211> 100

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1739479CD1

<400> 13

Met Trp Asp Ser Lys Lys Ile Gly Leu Arg Gln His His Cys Arg
1 5 10 15
Lys Cys Gly Lys Ala Val Cys Gly Lys Cys Ser Ser Lys Arg Ser
20 25 30
Ser Ile Pro Leu Met Gly Phe Glu Phe Glu Val Arg Val Cys Asp
35 40 45
Ser Cys His Glu Ala Ile Thr Asp Glu Glu Arg Ala Pro Thr Ala
50 55 60
Thr Phe His Asp Ser Lys His Asn Ile Val His Val His Phe Asp
65 70 75
Ala Thr Arg Gly Trp Leu Leu Thr Ser Gly Thr Asp Lys Val Ile
80 85 90
Lys Leu Trp Asp Met Thr Pro Val Val Ser
95 100

<210> 14

<211> 795

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1999147CD1

<400> 14

Met Thr Ser Gly Ala Thr Arg Tyr Arg Leu Ser Cys Ser Leu Arg
1 5 10 15
Gly His Glu Leu Asp Val Arg Gly Leu Val Cys Cys Ala Tyr Pro
20 25 30
Pro Gly Ala Phe Val Ser Val Ser Arg Asp Arg Thr Thr Arg Leu
35 40 45
Trp Ala Pro Asp Ser Pro Asn Arg Ser Phe Thr Glu Met His Cys
50 55 60
Met Ser Gly His Ser Asn Phe Val Ser Cys Val Cys Ile Ile Pro
65 70 75
Ser Ser Asp Ile Tyr Pro His Gly Leu Ile Ala Thr Gly Gly Asn

			80					85					90	
Asp	His	Asn	Ile	Cys	Ile	Phe	Ser	Leu	Asp	Ser	Pro	Met	Pro	Leu
			95						100					105
Tyr	Ile	Leu	Lys	Gly	His	Lys	Asn	Thr	Val	Cys	Ser	Leu	Ser	
			110						115					120
Gly	Lys	Phe	Gly	Thr	Leu	Leu	Ser	Gly	Ser	Trp	Asp	Thr	Thr	Ala
			125						130					135
Lys	Val	Trp	Leu	Asn	Asp	Lys	Cys	Met	Met	Thr	Leu	Gln	Gly	His
			140						145					150
Thr	Ala	Ala	Val	Trp	Ala	Val	Lys	Ile	Leu	Pro	Glu	Gln	Gly	Leu
			155						160					165
Met	Leu	Thr	Gly	Ser	Ala	Asp	Lys	Thr	Val	Lys	Leu	Trp	Lys	Ala
			170						175					180
Gly	Arg	Cys	Glu	Arg	Thr	Phe	Ser	Gly	His	Glu	Asp	Cys	Val	Arg
			185						190					195
Gly	Leu	Ala	Ile	Leu	Ser	Glu	Thr	Glu	Phe	Leu	Ser	Cys	Ala	Asn
			200						205					210
Asp	Ala	Ser	Ile	Arg	Arg	Trp	Gln	Ile	Thr	Gly	Glu	Cys	Leu	Glu
			215						220					225
Val	Tyr	Tyr	Gly	His	Thr	Asn	Tyr	Ile	Tyr	Ser	Ile	Ser	Val	Phe
			230						235					240
Pro	Asn	Cys	Arg	Asp	Phe	Val	Thr	Thr	Ala	Glu	Asp	Arg	Ser	Leu
			245						250					255
Arg	Ile	Trp	Lys	His	Gly	Glu	Cys	Ala	Gln	Thr	Ile	Arg	Leu	Pro
			260						265					270
Ala	Gln	Ser	Ile	Trp	Cys	Cys	Cys	Val	Leu	Asp	Asn	Gly	Asp	Ile
			275						280					285
Val	Val	Gly	Ala	Ser	Asp	Gly	Ile	Ile	Arg	Val	Phe	Thr	Glu	Ser
			290						295					300
Glu	Asp	Arg	Thr	Ala	Ser	Ala	Glu	Glu	Ile	Lys	Ala	Phe	Glu	Lys
			305						310					315
Glu	Leu	Ser	His	Ala	Thr	Ile	Asp	Ser	Lys	Thr	Gly	Asp	Leu	Gly
			320						325					330
Asp	Ile	Asn	Ala	Glu	Gln	Leu	Pro	Gly	Arg	Glu	His	Leu	Asn	Glu
			335						340					345
Pro	Gly	Thr	Arg	Glu	Gly	Gln	Thr	Arg	Leu	Ile	Arg	Asp	Gly	Glu
			350						355					360
Lys	Val	Glu	Ala	Tyr	Gln	Trp	Ser	Val	Ser	Glu	Gly	Arg	Trp	Ile
			365						370					375
Lys	Ile	Gly	Asp	Val	Val	Gly	Ser	Ser	Gly	Ala	Asn	Gln	Gln	Thr
			380						385					390
Ser	Gly	Lys	Val	Leu	Tyr	Glu	Gly	Lys	Glu	Phe	Asp	Tyr	Val	Phe
			395						400					405
Ser	Ile	Asp	Val	Asn	Glu	Gly	Gly	Pro	Ser	Tyr	Lys	Leu	Pro	Tyr
			410						415					420
Asn	Thr	Ser	Asp	Asp	Pro	Trp	Leu	Thr	Ala	Tyr	Asn	Phe	Leu	Gln
			425						430					435
Lys	Asn	Asp	Leu	Asn	Pro	Met	Phe	Leu	Asp	Gln	Val	Ala	Lys	Phe
			440						445					450
Ile	Ile	Asp	Asn	Thr	Lys	Gly	Gln	Met	Leu	Gly	Leu	Gly	Asn	Pro
			455						460					465
Ser	Phe	Ser	Asp	Pro	Phe	Thr	Gly	Gly	Gly	Arg	Tyr	Val	Pro	Gly
			470						475					480
Ser	Ser	Gly	Ser	Ser	Asn	Thr	Leu	Pro	Thr	Ala	Asp	Pro	Phe	Thr
			485						490					495
Gly	Ala	Gly	Arg	Tyr	Val	Pro	Gly	Ser	Ala	Ser	Met	Gly	Thr	Thr
			500						505					510
Met	Ala	Gly	Val	Asp	Pro	Phe	Thr	Gly	Asn	Ser	Ala	Tyr	Arg	Ser
			515						520					525
Ala	Ala	Ser	Lys	Thr	Met	Asn	Ile	Tyr	Phe	Pro	Lys	Lys	Glu	Ala
			530						535					540
Val	Thr	Phe	Asp	Gln	Ala	Asn	Pro	Thr	Gln	Ile	Leu	Gly	Lys	Leu
			545						550					555

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Lys Glu Leu Asn Gly Thr Ala Pro Glu Glu Lys Lys Leu Thr Glu
560 565 570
Asp Asp Leu Ile Leu Leu Glu Lys Ile Leu Ser Leu Ile Cys Asn
575 580 585
Ser Ser Ser Glu Lys Pro Thr Val Gln Gln Leu Gln Ile Leu Trp
590 595 600
Lys Ala Ile Asn Cys Pro Glu Asp Ile Val Phe Pro Ala Leu Asp
605 610 615
Ile Leu Arg Leu Ser Ile Lys His Pro Ser Val Asn Glu Asn Phe
620 625 630
Cys Asn Glu Lys Glu Gly Ala Gln Phe Ser Ser His Leu Ile Asn
635 640 645
Leu Leu Asn Pro Lys Gly Lys Pro Ala Asn Gln Leu Leu Ala Leu
650 655 660
Arg Thr Phe Cys Asn Cys Phe Val Gly Gln Ala Gly Gln Lys Leu
665 670 675
Met Met Ser Gln Arg Glu Ser Leu Met Ser His Ala Ile Glu Leu
680 685 690
Lys Ser Gly Ser Asn Lys Asn Ile His Ile Ala Leu Ala Thr Leu
695 700 705
Ala Leu Asn Tyr Ser Val Cys Phe His Lys Asp His Asn Ile Glu
710 715 720
Gly Lys Ala Gln Cys Leu Ser Leu Ile Ser Thr Ile Leu Glu Val
725 730 735
Val Gln Asp Leu Glu Ala Thr Phe Arg Leu Leu Val Ala Leu Gly
740 745 750
Thr Leu Ile Ser Asp Asp Ser Asn Ala Val Gln Leu Ala Lys Ser
755 760 765
Leu Gly Val Asp Ser Gln Ile Lys Lys Tyr Ser Ser Val Ser Glu
770 775 780
Pro Ala Lys Val Ser Glu Cys Cys Arg Phe Ile Leu Asn Leu Leu
785 790 795

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<210> 15

<211> 393

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2182085CD1

<400> 15

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Met Glu Asp Phe Glu Asp Asp Pro Arg Ala Leu Gly Ala Arg Gly
1 5 10 15
His Arg Arg Ser Val Ser Arg Gly Ser Tyr Gln Leu Gln Ala Gln
20 25 30
Met Asn Arg Ala Val Tyr Glu Asp Arg Pro Pro Gly Ser Val Val
35 40 45
Pro Thr Ser Ala Ala Glu Ala Ser Arg Ala Met Ala Gly Asp Thr
50 55 60
Ser Leu Ser Glu Asn Tyr Ala Phe Ala Gly Met Tyr His Val Phe
65 70 75
Asp Gln His Val Asp Glu Ala Val Pro Arg Val Arg Phe Ala Asn
80 85 90
Asp Asp Arg His Arg Leu Ala Cys Cys Ser Leu Asp Gly Ser Ile
95 100 105
Ser Leu Cys Gln Leu Val Pro Ala Pro Pro Thr Val Leu Arg Val
110 115 120
Leu Arg Gly His Thr Arg Gly Val Ser Asp Phe Ala Trp Ser Leu
125 130 135
Ser Asn Asp Ile Leu Val Ser Thr Ser Leu Asp Ala Thr Met Arg
140 145 150

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Ile Trp Ala Ser Glu Asp Gly Arg Cys Ile Arg Glu Ile Pro Asp
155 160 165
Pro Asp Ser Ala Glu Leu Leu Cys Cys Thr Phe Gln Pro Val Asn
170 175 180
Asn Asn Leu Thr Val Val Gly Asn Ala Lys His Asn Val His Val
185 190 195
Met Asn Ile Ser Thr Gly Lys Lys Val Lys Gly Gly Ser Ser Lys
200 205 210
Leu Thr Gly Arg Val Leu Ala Leu Ser Phe Asp Ala Pro Gly Arg
215 220 225
Leu Leu Trp Ala Gly Asp Asp Arg Gly Ser Val Phe Ser Phe Leu
230 235 240
Phe Asp Met Ala Thr Gly Lys Leu Thr Lys Ala Lys Arg Leu Val
245 250 255
Val His Glu Gly Ser Pro Val Thr Ser Ile Ser Ala Arg Ser Trp
260 265 270
Val Ser Arg Glu Ala Arg Asp Pro Ser Leu Leu Ile Asn Ala Cys
275 280 285
Leu Asn Lys Leu Leu Leu Tyr Arg Val Val Asp Asn Glu Gly Thr
290 295 300
Leu Gln Leu Lys Arg Ser Phe Pro Ile Glu Gln Ser Ser His Pro
305 310 315
Val Arg Ser Ile Phe Cys Pro Leu Met Ser Phe Arg Gln Gly Ala
320 325 330
Cys Val Val Thr Gly Ser Glu Asp Met Cys Val His Phe Phe Asp
335 340 345
Val Glu Arg Ala Ala Lys Ala Ala Val Asn Lys Leu Gln Gly His
350 355 360
Ser Ala Pro Val Leu Asp Val Ser Phe Asn Cys Asp Glu Ser Leu
365 370 375
Leu Ala Ser Ser Asp Ala Ser Gly Met Val Ile Val Trp Arg Arg
380 385 390
Glu Gln Lys

```

<210> 16

<211> 485

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2216640CD1

<400> 16

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Met Ala Ala Ala Val Ala Asp Glu Ala Val Ala Arg Asp Val Gln
1 5 10 15
Arg Leu Leu Val Gln Phe Gln Asp Glu Gly Gly Gln Leu Leu Gly
20 25 30
Ser Pro Phe Asp Val Pro Val Asp Ile Thr Pro Asp Arg Leu Gln
35 40 45
Leu Val Cys Asn Ala Leu Leu Ala Gln Glu Asp Pro Leu Pro Leu
50 55 60
Ala Phe Phe Val His Asp Ala Glu Ile Val Ser Ser Leu Gly Lys
65 70 75
Thr Leu Glu Ser Gln Ala Val Glu Thr Glu Lys Val Leu Asp Ile
80 85 90
Ile Tyr Gln Pro Gln Ala Ile Phe Arg Val Arg Ala Val Thr Arg
95 100 105
Cys Thr Ser Ser Leu Glu Gly His Ser Glu Ala Val Ile Ser Val
110 115 120
Ala Phe Ser Pro Thr Gly Lys Tyr Leu Ala Ser Gly Ser Gly Asp
125 130 135
Thr Thr Val Arg Phe Trp Asp Leu Ser Thr Glu Thr Pro His Phe

```

Thr Cys Lys Gly	140	145	150
His Arg His Trp Val	155	160	165
Pro Asp Gly Lys	170	175	180
Leu Leu Trp Asp	185	190	195
Ala Gly His Ser	200	205	210
His Ala Asn Pro	215	220	225
Gly Ser Val Arg	230	235	240
Ile Leu Thr Gly	245	250	255
Gly Asp Gly Leu	260	265	270
Val Trp Arg Ala	275	280	285
His Gly His Trp	290	295	300
Leu Arg Thr Gly	305	310	315
Gln Asp Leu Gln	320	325	330
Ser Arg Tyr Asn	335	340	345
Ser Gly Ser Asp	350	355	360
Asp Lys Lys Pro	365	370	375
Asn Gln Val Leu	380	385	390
Ser Phe Asp Lys	395	400	405
Tyr Leu Ala Ser	410	415	420
Ala Trp Ser Ala	425	430	435
Ser Thr Leu Lys	440	445	450
Asp Leu Pro Gly	455	460	465
Pro Asp Gly Gln	470	475	480
Arg Ile Trp Arg	485		

<210> 17

<211> 199

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2417361CD1

<400> 17

Met Asn Pro Arg Lys	Lys Val Asp Leu Lys	Leu Ile Ile Val Gly
1	5	10
Ala Ile Gly Val Gly	Lys Thr Ser Leu Leu	His Gln Tyr Val His
20	25	30
Lys Thr Phe Tyr Glu	Glu Tyr Gln Thr Thr	Leu Gly Ala Ser Ile
35	40	45

```

Leu Ser Lys Ile Ile Ile Leu Gly Asp Thr Thr Leu Lys Leu Gln
      50      55      60
Ile Trp Asp Thr Gly Gly Gln Glu Arg Phe Arg Ser Met Val Ser
      65      70      75
Thr Phe Tyr Lys Gly Ser Asp Gly Cys Ile Leu Ala Phe Asp Val
      80      85      90
Thr Asp Leu Glu Ser Phe Glu Ala Leu Asp Ile Trp Arg Gly Asp
      95     100     105
Val Leu Ala Lys Ile Val Pro Met Glu Gln Ser Tyr Pro Met Val
     110     115     120
Leu Leu Gly Asn Lys Ile Asp Leu Ala Asp Arg Lys Val Pro Gln
     125     130     135
Glu Val Ala Gln Gly Trp Cys Arg Glu Lys Asp Ile Pro Tyr Phe
     140     145     150
Glu Val Ser Ala Lys Asn Asp Ile Asn Val Val Gln Ala Phe Glu
     155     160     165
Met Leu Ala Ser Arg Ala Leu Ser Arg Tyr Gln Ser Ile Leu Glu
     170     175     180
Asn His Leu Thr Glu Ser Ile Lys Leu Ser Pro Asp Gln Ser Arg
     185     190     195
Ser Arg Cys Cys

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<210> 18
<211> 163
<212> PRT
<213> Homo sapiens

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<220>
<221> misc_feature
<223> Incyte ID No: 2454384CD1

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```

<400> 18
Met Glu Gly Pro Ser Leu Arg Gly Pro Ala Leu Arg Leu Ala Gly
  1      5      10      15
Leu Pro Thr Gln Gln Asp Cys Asn Ile Gln Glu Lys Ile Asp Leu
      20      25      30
Glu Ile Arg Met Arg Glu Gly Ile Trp Lys Leu Leu Ser Leu Ser
      35      40      45
Thr Gln Lys Asp Gln Val Leu His Ala Val Lys Asn Leu Met Val
      50      55      60
Cys Asn Ala Arg Leu Met Ala Tyr Thr Ser Glu Leu Gln Lys Leu
      65      70      75
Glu Glu Gln Ile Ala Asn Gln Thr Gly Arg Cys Asp Val Lys Phe
      80      85      90
Glu Ser Lys Glu Arg Thr Ala Cys Lys Gly Lys Ile Ala Ile Ser
      95     100     105
Asp Ile Arg Ile Pro Leu Met Trp Lys Asp Ser Asp His Phe Ser
     110     115     120
Asn Lys Glu Arg Ser Arg Arg Tyr Ala Ile Phe Cys Leu Phe Lys
     125     130     135
Met Gly Ala Asn Val Phe Asp Thr Asp Val Val Asn Val Asp Lys
     140     145     150
Thr Ile Thr Asp Ile Cys Phe Glu Asn Val Thr Ile Leu
     155     160

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<210> 19
<211> 290
<212> PRT
<213> Homo sapiens

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<220>
<221> misc_feature
<223> Incyte ID No: 2610262CD1

```

<400> 19

```

Met Ala Ala Glu Ile Gln Pro Lys Pro Leu Thr Arg Lys Pro Ile
 1      5      10      15
Leu Leu Gln Arg Met Glu Gly Ser Gln Glu Val Val Asn Met Ala
 20      25      30
Val Ile Val Pro Lys Glu Glu Gly Val Ile Ser Val Ser Glu Asp
 35      40      45
Arg Thr Val Arg Val Trp Leu Lys Arg Asp Ser Gly Gln Tyr Trp
 50      55      60
Pro Ser Val Tyr His Ala Met Pro Ser Pro Cys Ser Cys Met Ser
 65      70      75
Phe Asn Pro Glu Thr Arg Arg Leu Ser Ile Gly Leu Asp Asn Gly
 80      85      90
Thr Ile Ser Glu Phe Ile Leu Ser Glu Asp Tyr Asn Lys Met Thr
 95     100     105
Pro Val Lys Asn Tyr Gln Ala His Gln Ser Arg Val Thr Met Ile
110     115     120
Leu Phe Val Leu Glu Leu Glu Trp Val Leu Ser Thr Gly Gln Asp
125     130     135
Lys Gln Phe Ala Trp His Cys Ser Glu Ser Gly Gln Arg Leu Gly
140     145     150
Gly Tyr Arg Thr Ser Ala Val Ala Ser Gly Leu Gln Phe Asp Val
155     160     165
Glu Thr Arg His Val Phe Ile Gly Asp His Ser Gly Gln Val Thr
170     175     180
Ile Leu Lys Leu Glu Gln Glu Asn Cys Thr Leu Val Thr Thr Phe
185     190     195
Arg Gly His Thr Gly Gly Val Thr Ala Leu Cys Trp Asp Pro Val
200     205     210
Gln Arg Val Leu Phe Ser Gly Ser Ser Asp His Ser Val Ile Met
215     220     225
Trp Asp Ile Gly Gly Arg Lys Gly Thr Ala Ile Glu Leu Gln Gly
230     235     240
His Asn Asp Arg Val Gln Ala Leu Ser Tyr Ala Gln His Thr Arg
245     250     255
Gln Leu Ile Ser Cys Gly Gly Asp Gly Gly Ile Val Val Trp Asn
260     265     270
Met Asp Val Glu Arg Gln Glu Pro Leu Trp Ser Cys Phe Val Val
275     280     285
Met Ile Ser Ala Val
290

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<210> 20

<211> 705

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2700075CD1

<400> 20

```

Met Gly Thr Trp Glu His Leu Val Ser Thr Gly Phe Asn Gln Met
 1      5      10      15
Arg Glu Arg Glu Val Lys Leu Trp Asp Thr Arg Phe Phe Ser Ser
 20      25      30
Ala Leu Ala Ser Leu Thr Leu Asp Thr Ser Leu Gly Cys Leu Val
 35      40      45
Pro Leu Leu Asp Pro Asp Ser Gly Leu Leu Val Leu Ala Gly Lys
 50      55      60
Gly Glu Arg Gln Leu Tyr Cys Tyr Glu Val Val Pro Gln Gln Pro
 65      70      75
Ala Leu Ser Pro Val Thr Gln Cys Val Leu Glu Ser Val Leu Arg
 80      85      90

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Gly	Ala	Ala	Leu	Val	Pro	Arg	Gln	Ala	Leu	Ala	Val	Met	Ser	Cys
				95						100				105
Glu	Val	Leu	Arg	Val	Leu	Gln	Leu	Ser	Asp	Thr	Ala	Ile	Val	Pro
				110						115				120
Ile	Gly	Tyr	His	Val	Pro	Arg	Lys	Ala	Val	Glu	Phe	His	Glu	Asp
				125						130				135
Leu	Phe	Pro	Asp	Thr	Ala	Gly	Cys	Val	Pro	Ala	Thr	Asp	Pro	His
				140						145				150
Ser	Trp	Trp	Ala	Gly	Asp	Asn	Gln	Gln	Val	Gln	Lys	Val	Ser	Leu
				155						160				165
Asn	Pro	Ala	Cys	Arg	Pro	His	Pro	Ser	Phe	Thr	Ser	Cys	Leu	Val
				170						175				180
Pro	Pro	Ala	Glu	Pro	Leu	Pro	Asp	Thr	Ala	Gln	Pro	Ala	Val	Met
				185						190				195
Glu	Thr	Pro	Val	Gly	Asp	Ala	Asp	Ala	Ser	Glu	Gly	Phe	Ser	Ser
				200						205				210
Pro	Pro	Ser	Ser	Leu	Thr	Ser	Pro	Ser	Thr	Pro	Ser	Ser	Leu	Gly
				215						220				225
Pro	Ser	Leu	Ser	Ser	Thr	Ser	Gly	Ile	Gly	Thr	Ser	Pro	Ser	Leu
				230						235				240
Arg	Ser	Leu	Gln	Ser	Leu	Leu	Gly	Pro	Ser	Ser	Lys	Phe	Arg	His
				245						250				255
Ala	Gln	Gly	Thr	Val	Leu	His	Arg	Asp	Ser	His	Ile	Thr	Asn	Leu
				260						265				270
Lys	Gly	Leu	Asn	Leu	Thr	Thr	Pro	Gly	Glu	Ser	Asp	Gly	Phe	Cys
				275						280				285
Ala	Asn	Lys	Leu	Arg	Val	Ala	Val	Pro	Leu	Leu	Ser	Ser	Gly	Gly
				290						295				300
Gln	Val	Ala	Val	Leu	Glu	Leu	Arg	Lys	Pro	Gly	Arg	Leu	Pro	Asp
				305						310				315
Thr	Ala	Leu	Pro	Thr	Leu	Gln	Asn	Gly	Ala	Ala	Val	Thr	Asp	Leu
				320						325				330
Ala	Trp	Asp	Pro	Phe	Asp	Pro	His	Arg	Leu	Ala	Val	Ala	Gly	Glu
				335						340				345
Asp	Ala	Arg	Ile	Arg	Leu	Trp	Arg	Val	Pro	Ala	Glu	Gly	Leu	Glu
				350						355				360
Glu	Val	Leu	Thr	Thr	Pro	Glu	Thr	Val	Leu	Thr	Gly	His	Thr	Glu
				365						370				375
Lys	Ile	Cys	Ser	Leu	Arg	Phe	His	Pro	Leu	Ala	Ala	Asn	Val	Leu
				380						385				390
Ala	Ser	Ser	Ser	Tyr	Asp	Leu	Thr	Val	Arg	Ile	Trp	Asp	Leu	Gln
				395						400				405
Ala	Gly	Ala	Asp	Arg	Leu	Lys	Leu	Gln	Gly	His	Gln	Asp	Gln	Ile
				410						415				420
Phe	Ser	Leu	Ala	Trp	Ser	Pro	Asp	Gly	Gln	Gln	Leu	Ala	Thr	Val
				425						430				435
Cys	Lys	Asp	Gly	Arg	Val	Arg	Val	Tyr	Arg	Pro	Arg	Ser	Gly	Pro
				440						445				450
Glu	Pro	Leu	Gln	Glu	Gly	Pro	Gly	Pro	Lys	Gly	Gly	Arg	Gly	Ala
				455						460				465
Arg	Ile	Val	Trp	Val	Cys	Asp	Gly	Arg	Cys	Leu	Leu	Val	Ser	Gly
				470						475				480
Phe	Asp	Ser	Gln	Ser	Glu	Arg	Gln	Leu	Leu	Leu	Tyr	Glu	Ala	Glu
				485						490				495
Ala	Leu	Ala	Gly	Gly	Pro	Leu	Ala	Val	Leu	Gly	Leu	Asp	Val	Ala
				500						505				510
Pro	Ser	Thr	Leu	Leu	Pro	Ser	Tyr	Asp	Pro	Asp	Thr	Gly	Leu	Val
				515						520				525
Leu	Leu	Thr	Gly	Lys	Gly	Asp	Thr	Arg	Val	Phe	Leu	Tyr	Glu	Leu
				530						535				540
Leu	Pro	Glu	Ser	Pro	Phe	Phe	Leu	Glu	Cys	Asn	Ser	Phe	Thr	Ser
				545						550				555
Pro	Asp	Pro	His	Lys	Gly	Leu	Val	Leu	Leu	Pro	Lys	Thr	Glu	Cys

	560		565		570
Asp Val Arg Glu	Val Glu Leu Met Arg	Cys Leu Arg Leu Arg	Gln		
	575		580		585
Ser Ser Leu Glu	Pro Val Ala Phe Arg	Leu Pro Arg Val Arg	Lys		
	590		595		600
Glu Phe Phe Gln	Asp Asp Val Phe Pro	Asp Thr Ala Val Ile	Trp		
	605		610		615
Glu Pro Val Leu	Ser Ala Glu Ala Trp	Leu Gln Gly Ala Asn	Gly		
	620		625		630
Gln Pro Trp Leu	Leu Ser Leu Gln Pro	Pro Asp Met Ser Pro	Val		
	635		640		645
Ser Gln Ala Pro	Arg Glu Ala Pro Ala	Arg Arg Ala Pro Ser	Ser		
	650		655		660
Ala Gln Tyr Leu	Glu Glu Lys Ser Asp	Gln Gln Lys Lys Glu	Glu		
	665		670		675
Leu Leu Asn Ala	Met Val Ala Lys Leu	Gly Asn Arg Glu Asp	Pro		
	680		685		690
Leu Pro Gln Asp	Ser Phe Glu Gly Val	Asp Glu Asp Glu Trp	Asp		
	695		700		705

<210> 21

<211> 454

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2786701CD1

<400> 21

Met Ala Ser Ser	Glu Val Ala Arg His	Leu Leu Phe Gln Ser	His
1	5	10	15
Met Ala Thr Lys	Thr Thr Cys Met Ser	Ser Gln Gly Ser Asp	Asp
	20	25	30
Glu Gln Ile Lys	Arg Glu Asn Ile Arg	Ser Leu Thr Met Ser	Gly
	35	40	45
His Val Gly Phe	Glu Ser Leu Pro Asp	Gln Leu Val Asn Arg	Ser
	50	55	60
Ile Gln Gln Gly	Phe Cys Phe Asn Ile	Leu Cys Val Gly Glu	Thr
	65	70	75
Gly Ile Gly Lys	Ser Thr Leu Ile Asp	Thr Leu Phe Asn Thr	Asn
	80	85	90
Phe Glu Asp Tyr	Glu Ser Ser His Phe	Cys Pro Asn Val Lys	Leu
	95	100	105
Lys Ala Gln Thr	Tyr Glu Leu Gln Glu	Ser Asn Val Gln Leu	Lys
	110	115	120
Leu Thr Ile Val	Asn Thr Val Gly Phe	Gly Asp Gln Ile Asn	Lys
	125	130	135
Glu Glu Ser Tyr	Gln Pro Ile Val Asp	Tyr Ile Asp Ala Gln	Phe
	140	145	150
Glu Ala Tyr Leu	Gln Glu Glu Leu Lys	Ile Lys Arg Ser Leu	Phe
	155	160	165
Thr Tyr His Asp	Ser Arg Ile His Val	Cys Leu Tyr Phe Ile	Ser
	170	175	180
Pro Thr Gly His	Ser Leu Lys Thr Leu	Asp Leu Leu Thr Met	Lys
	185	190	195
Asn Leu Asp Ser	Lys Val Asn Ile Ile	Pro Val Ile Ala Lys	Ala
	200	205	210
Asp Thr Val Ser	Lys Thr Glu Leu Gln	Lys Phe Lys Ile Lys	Leu
	215	220	225
Met Ser Glu Leu	Val Ser Asn Gly Val	Gln Ile Tyr Gln Phe	Pro
	230	235	240
Thr Asp Asp Asp	Thr Ile Ala Lys Val	Asn Ala Ala Met Asn	Gly

	245		250		255
Gln Leu Pro Phe	Ala Val Val Gly Ser	Met Asp Glu Val Lys	Val		
	260		265		270
Gly Asn Lys Met	Val Lys Ala Arg Gln Tyr	Pro Trp Gly Val	Val		
	275		280		285
Gln Val Glu Asn	Glu Asn His Cys Asp	Phe Val Lys Leu Arg	Glu		
	290		295		300
Met Leu Ile Cys	Thr Asn Met Glu Asp	Leu Arg Glu Gln Thr	His		
	305		310		315
Thr Arg His Tyr	Glu Leu Tyr Arg Arg	Cys Lys Leu Glu Glu	Met		
	320		325		330
Gly Phe Thr Asp	Val Gly Pro Glu Asn Lys	Pro Val Ser Val	Gln		
	335		340		345
Glu Thr Tyr Glu	Ala Lys Arg His Glu	Phe His Gly Glu Arg	Gln		
	350		355		360
Arg Lys Glu Glu	Glu Met Lys Gln Met	Phe Val Gln Arg Val	Lys		
	365		370		375
Glu Lys Glu Ala	Ile Leu Lys Glu Ala	Glu Arg Glu Leu Gln	Ala		
	380		385		390
Lys Phe Glu His	Leu Lys Arg Leu His	Gln Glu Glu Arg Met	Lys		
	395		400		405
Leu Glu Glu Lys	Arg Arg Leu Leu Glu	Glu Glu Ile Ile Ala	Phe		
	410		415		420
Ser Lys Lys Lys	Ala Thr Ser Glu Ile	Phe His Ser Gln Ser	Phe		
	425		430		435
Leu Ala Thr Gly	Ser Asn Leu Arg Lys	Asp Lys Asp Arg Lys	Asn		
	440		445		450
Ser Asn Phe Leu					

<210> 22

<211> 433

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3068538CD1

<400> 22

Met Ala Gly Gln Asp	Pro Ala Leu Ser Thr	Ser His Pro Phe Tyr	
1	5	10	15
Asp Val Ala Arg His	Gly Ile Leu Gln Val	Ala Gly Asp Asp Arg	
	20	25	30
Phe Gly Arg Arg Val	Val Thr Phe Ser Cys	Cys Arg Met Pro Pro	
	35	40	45
Ser His Glu Leu Asp	His Gln Arg Leu Leu	Glu Tyr Leu Lys Tyr	
	50	55	60
Thr Leu Asp Gln Tyr	Val Glu Asn Asp Tyr	Thr Ile Val Tyr Phe	
	65	70	75
His Tyr Gly Leu Asn	Ser Arg Asn Lys Pro	Ser Leu Gly Trp Leu	
	80	85	90
Gln Ser Ala Tyr Lys	Glu Phe Asp Arg Lys	Tyr Lys Lys Asn Leu	
	95	100	105
Lys Ala Leu Tyr Val	Val His Pro Thr Ser	Phe Ile Lys Val Leu	
	110	115	120
Trp Asn Ile Leu Lys	Pro Leu Ile Ser His	Lys Phe Gly Lys Lys	
	125	130	135
Val Ile Tyr Phe Asn	Tyr Leu Ser Glu Leu	His Glu His Leu Lys	
	140	145	150
Tyr Asp Gln Leu Val	Ile Pro Pro Glu Val	Leu Arg Tyr Asp Glu	
	155	160	165
Lys Leu Gln Ser Leu	His Glu Gly Arg Thr	Pro Pro Pro Thr Lys	
	170	175	180

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Thr Pro Pro Pro Arg Pro Pro Leu Pro Thr Gln Gln Phe Gly Val
185 190 195
Ser Leu Gln Tyr Leu Lys Asp Lys Asn Gln Gly Glu Leu Ile Pro
200 205 210
Pro Val Leu Arg Phe Thr Val Thr Tyr Leu Arg Glu Lys Gly Leu
215 220 225
Arg Thr Glu Gly Leu Phe Arg Arg Ser Ala Ser Val Gln Thr Val
230 235 240
Arg Glu Ile Gln Arg Leu Tyr Asn Gln Gly Lys Pro Val Asn Phe
245 250 255
Asp Asp Tyr Gly Asp Ile His Ile Pro Ala Val Ile Leu Lys Thr
260 265 270
Phe Leu Arg Glu Leu Pro Gln Pro Leu Leu Thr Phe Gln Ala Tyr
275 280 285
Glu Gln Ile Leu Gly Ile Thr Cys Val Glu Ser Ser Leu Arg Val
290 295 300
Thr Gly Cys Arg Gln Ile Leu Arg Ser Leu Pro Glu His Asn Tyr
305 310 315
Val Val Leu Arg Tyr Leu Met Gly Phe Leu His Ala Val Ser Arg
320 325 330
Glu Ser Ile Phe Asn Lys Met Asn Ser Ser Asn Leu Ala Cys Val
335 340 345
Phe Gly Leu Asn Leu Ile Trp Pro Ser Gln Gly Val Ser Ser Leu
350 355 360
Ser Ala Leu Val Pro Leu Asn Met Phe Thr Glu Leu Leu Ile Glu
365 370 375
Tyr Tyr Glu Lys Ile Phe Ser Thr Pro Glu Ala Pro Gly Glu His
380 385 390
Gly Leu Ala Pro Trp Glu Gln Gly Ser Arg Ala Ala Pro Leu Gln
395 400 405
Glu Ala Val Pro Arg Thr Gln Ala Thr Gly Leu Thr Lys Pro Thr
410 415 420
Leu Pro Pro Ser Pro Leu Met Ala Ala Arg Arg Arg Leu
425 430

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<210> 23

<211> 406

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 5159072CD1

<400> 23

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Met Ala Asp Gly Asn Glu Asp Leu Arg Ala Asp Asp Leu Pro Gly
1 5 10 15
Pro Ala Phe Glu Ser Tyr Glu Ser Met Glu Leu Ala Cys Pro Ala
20 25 30
Glu Arg Ser Gly His Val Ala Val Ser Asp Gly Arg His Met Phe
35 40 45
Val Trp Gly Gly Tyr Lys Ser Asn Gln Val Arg Gly Leu Tyr Asp
50 55 60
Phe Tyr Leu Pro Arg Glu Glu Leu Trp Ile Tyr Asn Met Glu Thr
65 70 75
Gly Arg Trp Lys Lys Ile Asn Thr Glu Gly Asp Val Pro Pro Ser
80 85 90
Met Ser Gly Ser Cys Ala Val Cys Val Asp Arg Val Leu Tyr Leu
95 100 105
Phe Gly Gly His His Ser Arg Gly Asn Thr Asn Lys Phe Tyr Met
110 115 120
Leu Asp Ser Arg Ser Thr Asp Arg Val Leu Gln Trp Glu Arg Ile
125 130 135
Asp Cys Gln Gly Ile Pro Pro Ser Ser Lys Asp Lys Leu Gly Val

```


	140		145		150
Trp Val Tyr Lys Asn Lys Leu Ile Phe		Phe Gly Gly Tyr Gly Tyr			
	155		160		165
Leu Pro Glu Asp Lys Val Leu Gly Thr		Phe Glu Phe Asp Glu Thr			
	170		175		180
Ser Phe Trp Asn Ser Ser His Pro Arg		Gly Trp Asn Asp His Val			
	185		190		195
His Ile Leu Asp Thr Glu Thr Phe Thr		Trp Ser Gln Pro Ile Thr			
	200		205		210
Thr Gly Lys Ala Pro Ser Pro Arg Ala		Ala His Ala Cys Ala Thr			
	215		220		225
Val Gly Asn Arg Gly Phe Val Phe Gly		Gly Arg Tyr Arg Asp Ala			
	230		235		240
Arg Met Asn Asp Leu His Tyr Leu Asn		Leu Asp Thr Trp Glu Trp			
	245		250		255
Asn Glu Leu Ile Pro Gln Gly Ile Cys		Pro Val Gly Arg Ser Trp			
	260		265		270
His Ser Leu Thr Pro Val Ser Ser Asp		His Leu Phe Leu Phe Gly			
	275		280		285
Gly Phe Thr Thr Asp Lys Gln Pro Leu		Ser Asp Ala Trp Thr Tyr			
	290		295		300
Cys Ile Ser Lys Asn Glu Trp Ile Gln		Phe Asn His Pro Tyr Thr			
	305		310		315
Glu Lys Pro Arg Leu Trp His Thr Ala		Cys Ala Ser Asp Glu Gly			
	320		325		330
Glu Val Ile Val Phe Gly Gly Cys Ala		Asn Asn Leu Leu Val His			
	335		340		345
His Arg Ala Ala His Ser Asn Glu Ile		Leu Ile Phe Ser Val Gln			
	350		355		360
Pro Lys Ser Leu Val Arg Leu Ser Leu		Glu Ala Val Ile Cys Phe			
	365		370		375
Lys Glu Met Leu Ala Asn Ser Trp Asn		Cys Leu Pro Lys His Leu			
	380		385		390
Leu His Ser Val Asn Gln Arg Phe Gly		Ser Asn Asn Thr Ser Gly			
	395		400		405

Ser

<210> 24

<211> 229

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 5519057CD1

<400> 24

Met Ala Glu Glu Met	Glu Ser Ser Leu	Glu Ala Ser Phe Ser Ser
1	5	10
Ser Gly Ala Val Ser	Gly Ala Ser Gly	Phe Leu Pro Pro Ala Arg
	20	25
Ser Arg Ile Phe Lys	Ile Ile Val Ile	Gly Asp Ser Asn Val Gly
	35	40
Lys Thr Cys Leu Thr	Tyr Arg Phe Cys	Ala Gly Arg Phe Pro Asp
	50	55
Arg Thr Glu Ala Thr	Ile Gly Val Asp	Phe Arg Glu Arg Ala Val
	65	70
Glu Ile Asp Gly Glu	Arg Ile Lys Ile	Gln Leu Trp Asp Thr Ala
	80	85
Gly Gln Glu Arg Phe	Arg Lys Ser Met	Val Gln His Tyr Tyr Arg
	95	100
Asn Val His Ala Val	Val Phe Val Tyr	Asp Met Thr Asn Met Ala
	110	115

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Ser Phe His Ser Leu Pro Ser Trp Ile Glu Glu Cys Lys Gln His
      125      130      135
Leu Leu Ala Asn Asp Ile Pro Arg Ile Leu Val Gly Asn Lys Cys
      140      145      150
Asp Leu Arg Ser Ala Ile Gln Val Pro Thr Asp Leu Ala Gln Lys
      155      160      165
Phe Ala Asp Thr His Ser Met Pro Leu Phe Glu Thr Ser Ala Lys
      170      175      180
Asn Pro Asn Asp Asn Asp His Val Glu Ala Ile Phe Met Thr Leu
      185      190      195
Ala His Lys Leu Lys Cys His Lys Pro Leu Met Leu Ser Gln Pro
      200      205      210
Pro Asp Asn Gly Ile Leu Lys Pro Glu Pro Lys Pro Ala Met
      215      220      225
Thr Cys Trp Cys

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<210> 25

<211> 670

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 035379CD1

<400> 25

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Met Ser Ser Gly Lys Ser Ala Arg Tyr Asn Arg Phe Ser Gly Gly
  1      5      10      15
Pro Ser Asn Leu Pro Thr Pro Asp Val Thr Thr Gly Thr Arg Met
      20      25      30
Glu Thr Thr Phe Gly Pro Ala Phe Ser Ala Val Thr Thr Ile Thr
      35      40      45
Lys Ala Asp Gly Thr Ser Thr Tyr Lys Gln His Cys Arg Thr Pro
      50      55      60
Ser Ser Ser Ser Thr Leu Ala Tyr Ser Pro Arg Asp Glu Glu Asp
      65      70      75
Ser Met Pro Pro Ile Ser Thr Pro Arg Arg Ser Asp Ser Ala Ile
      80      85      90
Ser Val Arg Ser Leu His Ser Glu Ser Ser Met Ser Leu Arg Ser
      95      100      105
Thr Phe Ser Leu Pro Glu Glu Glu Glu Glu Pro Glu Pro Leu Val
      110      115      120
Phe Ala Glu Gln Pro Ser Val Lys Leu Cys Cys Gln Leu Cys Cys
      125      130      135
Ser Val Phe Lys Asp Pro Val Ile Thr Thr Cys Gly His Thr Phe
      140      145      150
Cys Arg Arg Cys Ala Leu Lys Ser Glu Lys Cys Pro Val Asp Asn
      155      160      165
Val Lys Leu Thr Val Val Val Asn Asn Ile Ala Val Ala Glu Gln
      170      175      180
Ile Gly Glu Leu Phe Ile His Cys Arg His Gly Cys Arg Val Ala
      185      190      195
Gly Ser Gly Lys Pro Pro Ile Phe Glu Val Asp Pro Arg Gly Cys
      200      205      210
Pro Phe Thr Ile Lys Leu Ser Ala Arg Lys Asp His Glu Gly Ser
      215      220      225
Cys Asp Tyr Arg Pro Val Arg Cys Pro Asn Asn Pro Ser Cys Pro
      230      235      240
Pro Leu Leu Arg Met Asn Leu Glu Ala His Leu Lys Glu Cys Glu
      245      250      255
His Ile Lys Cys Pro His Ser Lys Tyr Gly Cys Thr Phe Ile Gly
      260      265      270
Asn Gln Asp Thr Tyr Glu Thr His Leu Glu Thr Cys Arg Phe Glu

```

	275		280		285
Gly Leu Lys Glu Phe	Leu Gln Gln Thr	Asp Asp Arg Phe His	Glu		
	290		295		300
Met His Val Ala Leu	Ala Gln Lys Asp	Gln Glu Ile Ala Phe	Leu		
	305		310		315
Arg Ser Met Leu Gly	Lys Leu Ser Glu	Lys Ile Asp Gln Leu	Glu		
	320		325		330
Lys Ser Leu Glu Leu	Lys Phe Asp Val	Leu Asp Glu Asn Gln	Ser		
	335		340		345
Lys Leu Ser Glu Asp	Leu Met Glu Phe	Arg Arg Asp Ala Ser	Met		
	350		355		360
Leu Asn Asp Glu Leu	Ser His Ile Asn	Ala Arg Leu Asn Met	Gly		
	365		370		375
Ile Leu Gly Ser Tyr	Asp Pro Gln Gln	Ile Phe Lys Cys Lys	Gly		
	380		385		390
Thr Phe Val Gly His	Gln Gly Pro Val	Trp Cys Leu Cys Val	Tyr		
	395		400		405
Ser Met Gly Asp Leu	Leu Phe Ser Gly	Ser Ser Asp Lys Thr	Ile		
	410		415		420
Lys Val Trp Asp Thr	Cys Thr Thr Tyr	Lys Cys Gln Lys Thr	Leu		
	425		430		435
Glu Gly His Asp Gly	Ile Val Leu Ala	Leu Cys Ile Gln Gly	Cys		
	440		445		450
Lys Leu Tyr Ser Gly	Ser Ala Asp Cys	Thr Ile Ile Val Trp	Asp		
	455		460		465
Ile Gln Asn Leu Gln	Lys Val Asn Thr	Ile Arg Ala His Asp	Asn		
	470		475		480
Pro Val Cys Thr Leu	Val Ser Ser His	Asn Val Leu Phe Ser	Gly		
	485		490		495
Ser Leu Lys Ala Ile	Lys Val Trp Asp	Ile Val Gly Thr Glu	Leu		
	500		505		510
Lys Leu Lys Lys Glu	Leu Thr Gly Leu	Asn His Trp Val Arg	Ala		
	515		520		525
Leu Val Ala Ala Gln	Ser Tyr Leu Tyr	Ser Gly Ser Tyr Gln	Thr		
	530		535		540
Ile Lys Ile Trp Asp	Ile Arg Thr Leu	Asp Cys Ile His Val	Leu		
	545		550		555
Gln Thr Ser Gly Gly	Ser Val Tyr Ser	Ile Ala Val Thr Asn	His		
	560		565		570
His Ile Val Cys Gly	Thr Tyr Glu Asn	Leu Ile His Val Trp	Asp		
	575		580		585
Ile Glu Ser Lys Glu	Gln Val Arg Thr	Leu Thr Gly His Val	Gly		
	590		595		600
Thr Val Tyr Ala Leu	Ala Val Ile Ser	Thr Pro Asp Gln Thr	Lys		
	605		610		615
Val Phe Ser Ala Ser	Tyr Asp Arg Ser	Leu Arg Val Trp Ser	Met		
	620		625		630
Asp Asn Met Ile Cys	Thr Gln Thr Leu	Leu Arg His Gln Ser	Ser		
	635		640		645
Val Thr Ala Leu Ala	Val Ser Arg Gly	Arg Leu Phe Ser Gly	Ala		
	650		655		660
Val Asp Ser Thr Val	Lys Val Trp Thr	Cys			
	665		670		

<210> 26

<211> 445

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 275354CD1

<400> 26

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Met Lys Val Lys Met Leu Ser Arg Asn Pro Asp Asn Tyr Val Arg
 1      5      10      15
Glu Thr Lys Leu Asp Leu Gln Arg Val Pro Arg Asn Tyr Asp Pro
 20      25      30
Ala Leu His Pro Phe Glu Val Pro Arg Glu Tyr Val Arg Ala Leu
 35      40      45
Asn Ala Thr Lys Leu Glu Arg Val Phe Ala Lys Pro Phe Leu Ala
 50      55      60
Ser Leu Asp Gly His Arg Asp Gly Val Asn Cys Leu Ala Lys His
 65      70      75
Pro Glu Lys Leu Ala Thr Val Leu Ser Gly Ala Cys Asp Gly Glu
 80      85      90
Val Arg Ile Trp Asn Leu Thr Gln Arg Asn Cys Ile Arg Thr Ile
 95      100     105
Gln Ala His Glu Gly Phe Val Arg Gly Ile Cys Thr Arg Phe Cys
 110     115     120
Gly Thr Ser Phe Phe Thr Val Gly Asp Asp Lys Thr Val Lys Gln
 125     130     135
Trp Lys Met Asp Gly Pro Gly Tyr Gly Asp Glu Glu Glu Pro Leu
 140     145     150
His Thr Ile Leu Gly Lys Thr Val Tyr Thr Gly Ile Asp His His
 155     160     165
Trp Lys Glu Ala Val Phe Ala Thr Cys Gly Gln Gln Val Asp Ile
 170     175     180
Trp Asp Glu Gln Arg Thr Asn Pro Ile Cys Ser Met Thr Trp Gly
 185     190     195
Phe Asp Ser Ile Ser Ser Val Lys Phe Asn Pro Ile Glu Thr Phe
 200     205     210
Leu Leu Gly Ser Cys Ala Ser Asp Arg Asn Ile Val Leu Tyr Asp
 215     220     225
Met Arg Gln Ala Thr Pro Leu Lys Lys Val Ile Leu Asp Met Arg
 230     235     240
Thr Asn Thr Ile Cys Trp Asn Pro Met Glu Ala Phe Ile Phe Thr
 245     250     255
Ala Ala Asn Glu Asp Tyr Asn Leu Tyr Thr Phe Asp Met Arg Ala
 260     265     270
Leu Asp Thr Pro Val Met Val His Met Asp His Val Ser Ala Val
 275     280     285
Leu Asp Val Asp Tyr Ser Pro Thr Gly Lys Glu Phe Val Ser Ala
 290     295     300
Ser Phe Asp Lys Ser Ile Arg Ile Phe Pro Val Asp Lys Ser Arg
 305     310     315
Ser Arg Glu Val Tyr His Thr Lys Arg Met Gln His Val Ile Cys
 320     325     330
Val Lys Trp Thr Ser Asp Ser Lys Tyr Ile Met Cys Gly Ser Asp
 335     340     345
Glu Met Asn Ile Arg Leu Trp Lys Ala Asn Ala Ser Glu Lys Leu
 350     355     360
Gly Val Leu Thr Ser Arg Glu Lys Ala Ala Lys Asp Tyr Asn Gln
 365     370     375
Lys Leu Lys Glu Lys Phe Gln His Tyr Pro His Ile Lys Arg Ile
 380     385     390
Ala Arg His Arg His Leu Pro Lys Ser Ile Tyr Ser Gln Ile Gln
 395     400     405
Glu Gln Arg Ile Met Lys Glu Ala Arg Arg Arg Lys Glu Val Asn
 410     415     420
Arg Ile Lys His Ser Lys Pro Gly Ser Val Pro Leu Val Ser Glu
 425     430     435
Lys Lys Lys His Val Val Ala Val Val Lys
 440     445

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<210> 27

<211> 236

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 311658CD1

<400> 27

```

Met Ser Asp Leu Leu Ser Pro Leu Leu Tyr Val Met Glu Asn Glu
 1          5          10          15
Val Asp Ala Phe Trp Cys Phe Ala Ser Tyr Met Asp Gln Met His
          20          25          30
Gln Asn Phe Glu Glu Gln Met Gln Gly Met Lys Thr Gln Leu Ile
          35          40          45
Gln Leu Ser Thr Leu Leu Arg Leu Leu Asp Ser Gly Phe Cys Ser
          50          55          60
Tyr Leu Glu Ser Gln Asp Ser Gly Tyr Leu Tyr Phe Cys Phe Arg
          65          70          75
Trp Leu Leu Ile Arg Phe Lys Arg Glu Phe Ser Phe Leu Asp Ile
          80          85          90
Leu Arg Leu Trp Glu Val Met Trp Thr Glu Leu Pro Cys Thr Asn
          95          100          105
Phe His Leu Leu Leu Cys Cys Ala Ile Leu Glu Ser Glu Lys Gln
          110          115          120
Gln Ile Met Glu Lys His Tyr Gly Phe Asn Glu Ile Leu Lys His
          125          130          135
Ile Asn Glu Leu Ser Met Lys Ile Asp Val Glu Asp Ile Leu Cys
          140          145          150
Lys Ala Glu Ala Ile Ser Leu Gln Met Val Lys Cys Lys Glu Leu
          155          160          165
Pro Gln Ala Val Cys Glu Ile Leu Gly Leu Gln Gly Ser Glu Val
          170          175          180
Thr Thr Pro Asp Ser Asp Val Gly Glu Asp Glu Asn Val Val Met
          185          190          195
Thr Pro Cys Pro Thr Ser Ala Phe Gln Ser Asn Ala Leu Pro Thr
          200          205          210
Leu Ser Ala Ser Gly Ala Arg Asn Asp Ser Pro Thr Gln Ile Pro
          215          220          225
Val Ser Ser Asp Val Cys Arg Leu Thr Pro Ala
          230          235

```

<210> 28

<211> 498

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1251632CD1

<400> 28

```

Met Gln Glu Ser Gly Cys Arg Leu Glu His Pro Ser Ala Thr Lys
 1          5          10          15
Phe Arg Asn His Val Met Glu Gly Asp Trp Asp Lys Ala Glu Asn
          20          25          30
Asp Leu Asn Glu Leu Lys Pro Leu Val His Ser Pro His Ala Ile
          35          40          45
Val Arg Met Lys Phe Leu Leu Leu Gln Gln Lys Tyr Leu Glu Tyr
          50          55          60
Leu Glu Asp Gly Lys Val Leu Glu Ala Leu Gln Val Leu Arg Cys
          65          70          75
Glu Leu Thr Pro Leu Lys Tyr Asn Thr Glu Arg Ile His Val Leu
          80          85          90
Ser Gly Tyr Leu Met Cys Ser His Ala Glu Asp Leu Arg Ala Lys
          95          100          105

```

Ala	Glu	Trp	Glu	Gly	Lys	Gly	Thr	Ala	Ser	Arg	Ser	Lys	Leu	Leu
				110					115					120
Asp	Lys	Leu	Gln	Thr	Tyr	Leu	Pro	Pro	Ser	Val	Met	Leu	Pro	Pro
				125					130					135
Arg	Arg	Leu	Gln	Thr	Leu	Leu	Arg	Gln	Ala	Val	Glu	Leu	Gln	Arg
				140					145					150
Asp	Arg	Cys	Leu	Tyr	His	Asn	Thr	Lys	Leu	Asp	Asn	Asn	Leu	Asp
				155					160					165
Ser	Val	Ser	Leu	Phe	Ile	Asp	His	Val	Cys	Ser	Arg	Arg	Gln	Phe
				170					175					180
Pro	Cys	Tyr	Thr	Gln	Gln	Ile	Leu	Thr	Glu	His	Cys	Asn	Glu	Val
				185					190					195
Trp	Phe	Cys	Lys	Phe	Ser	Asn	Asp	Gly	Thr	Lys	Leu	Ala	Thr	Gly
				200					205					210
Ser	Lys	Asp	Thr	Thr	Val	Ile	Ile	Trp	Gln	Val	Asp	Pro	Asp	Thr
				215					220					225
His	Leu	Leu	Lys	Leu	Leu	Lys	Thr	Leu	Glu	Gly	His	Ala	Tyr	Gly
				230					235					240
Val	Ser	Tyr	Ile	Ala	Trp	Ser	Pro	Asp	Asp	Asn	Tyr	Leu	Val	Ala
				245					250					255
Cys	Gly	Pro	Asp	Asp	Cys	Ser	Glu	Leu	Trp	Leu	Trp	Asn	Val	Gln
				260					265					270
Thr	Gly	Glu	Leu	Arg	Thr	Lys	Met	Ser	Gln	Ser	His	Glu	Asp	Ser
				275					280					285
Leu	Thr	Ser	Val	Ala	Trp	Asn	Pro	Asp	Gly	Lys	Arg	Phe	Val	Thr
				290					295					300
Gly	Gly	Gln	Arg	Gly	Gln	Phe	Tyr	Gln	Cys	Asp	Leu	Asp	Gly	Asn
				305					310					315
Leu	Leu	Asp	Ser	Trp	Glu	Gly	Val	Arg	Val	Gln	Cys	Leu	Trp	Cys
				320					325					330
Leu	Ser	Asp	Gly	Lys	Thr	Val	Leu	Ala	Ser	Asp	Thr	His	Gln	Arg
				335					340					345
Ile	Arg	Gly	Tyr	Asn	Phe	Glu	Asp	Leu	Thr	Asp	Arg	Asn	Ile	Val
				350					355					360
Gln	Glu	Asp	His	Pro	Ile	Met	Ser	Phe	Thr	Ile	Ser	Lys	Asn	Gly
				365					370					375
Arg	Leu	Ala	Leu	Leu	Asn	Val	Ala	Thr	Gln	Gly	Val	His	Leu	Trp
				380					385					390
Asp	Leu	Gln	Asp	Arg	Val	Leu	Val	Arg	Lys	Tyr	Gln	Gly	Val	Thr
				395					400					405
Gln	Gly	Phe	Tyr	Thr	Ile	His	Ser	Cys	Phe	Gly	Gly	His	Asn	Glu
				410					415					420
Asp	Phe	Ile	Ala	Ser	Gly	Ser	Glu	Asp	His	Lys	Val	Tyr	Ile	Trp
				425					430					435
His	Lys	Arg	Ser	Glu	Leu	Pro	Ile	Ala	Glu	Leu	Thr	Gly	His	Thr
				440					445					450
Arg	Thr	Val	Asn	Cys	Val	Ser	Trp	Asn	Pro	Gln	Ile	Pro	Ser	Met
				455					460					465
Met	Ala	Ser	Ala	Ser	Asp	Asp	Gly	Thr	Val	Arg	Ile	Trp	Gly	Pro
				470					475					480
Ala	Pro	Phe	Ile	Asp	His	Gln	Asn	Ile	Glu	Glu	Glu	Cys	Ser	Ser
				485					490					495

Met Asp Ser

<210> 29

<211> 334

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1331955CD1

<400> 29

```

Met Ala Thr Glu Glu Lys Lys Pro Glu Thr Glu Ala Ala Arg Ala
 1      5      10      15
Gln Pro Thr Pro Ser Ser Ser Ala Thr Gln Ser Lys Pro Thr Pro
 20      25      30
Val Lys Pro Asn Tyr Ala Leu Lys Phe Thr Leu Ala Gly His Thr
 35      40      45
Lys Ala Val Ser Ser Val Lys Phe Ser Pro Asn Gly Glu Trp Leu
 50      55      60
Ala Ser Ser Ser Ala Asp Lys Leu Ile Lys Ile Trp Gly Ala Tyr
 65      70      75
Asp Gly Lys Phe Glu Lys Thr Ile Ser Gly His Lys Leu Gly Ile
 80      85      90
Ser Asp Val Ala Trp Ser Ser Asp Ser Asn Leu Leu Val Ser Ala
 95      100     105
Ser Asp Asp Lys Thr Leu Lys Ile Trp Asp Val Ser Ser Gly Lys
110     115     120
Cys Leu Lys Thr Leu Lys Gly His Ser Asn Tyr Val Phe Cys Cys
125     130     135
Asn Phe Asn Pro Gln Ser Asn Leu Ile Val Ser Gly Ser Phe Asp
140     145     150
Glu Ser Val Arg Ile Trp Asp Val Lys Thr Gly Lys Cys Leu Lys
155     160     165
Thr Leu Pro Ala His Ser Asp Pro Val Ser Ala Val His Phe Asn
170     175     180
Arg Asp Gly Ser Leu Ile Val Ser Ser Ser Tyr Asp Gly Leu Cys
185     190     195
Arg Ile Trp Asp Thr Ala Ser Gly Gln Cys Leu Lys Thr Leu Ile
200     205     210
Asp Asp Asp Asn Pro Pro Val Ser Phe Val Lys Phe Ser Pro Asn
215     220     225
Gly Lys Tyr Ile Leu Ala Ala Thr Leu Asp Asn Thr Leu Lys Leu
230     235     240
Trp Asp Tyr Ser Lys Gly Lys Cys Leu Lys Thr Tyr Thr Gly His
245     250     255
Lys Asn Glu Lys Tyr Cys Ile Phe Ala Asn Phe Ser Val Thr Gly
260     265     270
Gly Lys Trp Ile Val Ser Gly Ser Glu Asp Asn Leu Val Tyr Ile
275     280     285
Trp Asn Leu Gln Thr Lys Glu Ile Val Gln Lys Leu Gln Gly His
290     295     300
Thr Asp Val Val Ile Ser Thr Ala Cys His Pro Thr Glu Asn Ile
305     310     315
Ile Ala Ser Ala Ala Leu Glu Asn Asp Lys Thr Ile Lys Leu Trp
320     325     330
Lys Ser Asp Cys

```

<210> 30

<211> 292

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1412614CD1

<400> 30

```

Met Met Ala Phe Ala Pro Pro Lys Asn Thr Asp Gly Pro Lys Met
 1      5      10      15
Gln Thr Lys Met Ser Thr Trp Thr Pro Leu Asn His Gln Leu Leu
 20      25      30
Asn Asp Arg Val Phe Glu Glu Arg Arg Ala Leu Leu Gly Lys Trp
 35      40      45

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Phe Asp Lys Trp Thr Asp Ser Gln Arg Arg Arg Ile Leu Thr Gly
      50      55      60
Leu Leu Glu Arg Cys Ser Leu Ser Gln Gln Lys Phe Cys Cys Arg
      65      70      75
Lys Leu Gln Glu Lys Ile Pro Ala Glu Ala Leu Asp Phe Thr Thr
      80      85      90
Lys Leu Pro Arg Val Leu Ser Leu Tyr Ile Phe Ser Phe Leu Asp
      95     100     105
Pro Arg Ser Leu Cys Arg Cys Ala Gln Val Cys Trp His Trp Lys
     110     115     120
Asn Leu Ala Glu Leu Asp Gln Leu Trp Met Leu Lys Cys Leu Arg
     125     130     135
Phe Asn Trp Tyr Ile Asn Phe Ser Pro Thr Pro Phe Glu Gln Gly
     140     145     150
Ile Trp Lys Lys His Tyr Ile Gln Met Val Lys Glu Leu His Ile
     155     160     165
Thr Lys Pro Lys Thr Pro Pro Lys Asp Gly Phe Val Ile Ala Asp
     170     175     180
Val Gln Leu Val Thr Ser Asn Ser Pro Glu Glu Lys Gln Ser Pro
     185     190     195
Leu Ser Ala Phe Arg Ser Ser Ser Ser Leu Arg Lys Lys Asn Asn
     200     205     210
Ser Gly Glu Lys Ala Leu Pro Pro Trp Arg Ser Ser Asp Lys His
     215     220     225
Pro Thr Asp Ile Ile Arg Phe Asn Tyr Leu Asp Asn Arg Asp Pro
     230     235     240
Met Glu Thr Val Gln Gln Gly Arg Arg Lys Arg Asn Gln Ile Thr
     245     250     255
Pro Asp Phe Ser Arg Gln Ser His Asp Lys Lys Asn Lys Leu Gln
     260     265     270
Asp Arg Thr Arg Leu Arg Lys Ala Gln Ser Met Met Ser Arg Arg
     275     280     285
Asn Pro Phe Pro Leu Cys Pro
     290

```

<210> 31

<211> 588

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1750781CD1

<400> 31

```

Met Ser Ser Gly Leu Arg Ala Ala Asp Phe Pro Arg Trp Lys Arg
  1      5      10      15
His Ile Ser Glu Gln Leu Arg Arg Arg Asp Arg Leu Gln Arg Gln
     20      25      30
Ala Phe Glu Glu Ile Ile Leu Gln Tyr Asn Lys Leu Leu Glu Lys
     35      40      45
Ser Asp Leu His Ser Val Leu Ala Gln Lys Leu Gln Ala Glu Lys
     50      55      60
His Asp Val Pro Asn Arg His Glu Ile Ser Pro Gly His Asp Gly
     65      70      75
Thr Trp Asn Asp Asn Gln Leu Gln Glu Met Ala Gln Leu Arg Ile
     80      85      90
Lys His Gln Glu Glu Leu Thr Glu Leu His Lys Lys Arg Gly Glu
     95     100     105
Leu Ala Gln Leu Val Ile Asp Leu Asn Asn Gln Met Gln Arg Lys
    110     115     120
Asp Arg Glu Met Gln Met Asn Glu Ala Lys Ile Ala Glu Cys Leu
    125     130     135
Gln Thr Ile Ser Asp Leu Glu Thr Glu Cys Leu Asp Leu Arg Thr

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	140		145		150
Lys Leu Cys Asp	Leu Glu Arg Ala Asn Gln	Thr Leu Lys Asp	Glu		
	155		160		165
Tyr Asp Ala Leu	Gln Ile Thr Phe Thr	Ala Leu Glu Gly Lys	Leu		
	170		175		180
Arg Lys Thr Thr	Glu Glu Asn Gln Glu	Leu Val Thr Arg Trp	Met		
	185		190		195
Ala Glu Lys Ala	Gln Glu Ala Asn Arg	Leu Asn Ala Glu Asn	Glu		
	200		205		210
Lys Asp Ser Arg	Arg Arg Gln Ala Arg	Leu Gln Lys Glu Leu	Ala		
	215		220		225
Glu Ala Ala Lys	Glu Pro Leu Pro Val	Glu Gln Asp Asp Asp	Ile		
	230		235		240
Glu Val Ile Val	Asp Glu Thr Ser Asp	His Thr Glu Glu Thr	Ser		
	245		250		255
Pro Val Arg Ala	Ile Ser Arg Ala Ala	Thr Arg Arg Ser Val	Ser		
	260		265		270
Ser Phe Pro Val	Pro Gln Asp Asn Val	Asp Thr His Pro Gly	Ser		
	275		280		285
Gly Lys Glu Val	Arg Val Pro Ala Thr	Ala Leu Cys Val Phe	Asp		
	290		295		300
Ala His Asp Gly	Glu Val Asn Ala Val	Gln Phe Ser Pro Gly	Ser		
	305		310		315
Arg Leu Leu Ala	Thr Gly Gly Met Asp	Arg Arg Val Lys Leu	Trp		
	320		325		330
Glu Val Phe Gly	Glu Lys Cys Glu Phe	Lys Gly Ser Leu Ser	Gly		
	335		340		345
Ser Asn Ala Gly	Ile Thr Ser Ile Glu	Phe Asp Ser Ala Gly	Ser		
	350		355		360
Tyr Leu Leu Ala	Ala Ser Asn Asp Phe	Ala Ser Arg Ile Trp	Thr		
	365		370		375
Val Asp Asp Tyr	Arg Leu Arg His Thr	Leu Thr Gly His Ser	Gly		
	380		385		390
Lys Val Leu Ser	Ala Lys Phe Leu Leu	Asp Asn Ala Arg Ile	Val		
	395		400		405
Ser Gly Ser His	Asp Arg Thr Leu Lys	Leu Trp Asp Leu Arg	Ser		
	410		415		420
Lys Val Cys Ile	Lys Thr Val Phe Ala	Gly Ser Ser Cys Asn	Asp		
	425		430		435
Ile Val Cys Thr	Glu Gln Cys Val Met	Ser Gly His Phe Asp	Lys		
	440		445		450
Lys Ile Arg Phe	Trp Asp Ile Arg Ser	Glu Ser Ile Val Arg	Glu		
	455		460		465
Met Glu Leu Leu	Gly Lys Ile Thr Ala	Leu Asp Leu Asn Pro	Glu		
	470		475		480
Arg Thr Glu Leu	Leu Ser Cys Ser Arg	Asp Asp Leu Leu Lys	Val		
	485		490		495
Ile Asp Leu Arg	Thr Asn Ala Ile Lys	Gln Thr Phe Ser Ala	Pro		
	500		505		510
Gly Phe Lys Cys	Gly Ser Asp Trp Thr	Arg Val Val Phe Ser	Pro		
	515		520		525
Asp Gly Ser Tyr	Val Ala Ala Gly Ser	Ala Glu Gly Ser Leu	Tyr		
	530		535		540
Ile Trp Ser Val	Leu Thr Gly Lys Val	Glu Lys Val Leu Ser	Lys		
	545		550		555
Gln His Ser Ser	Ser Ile Asn Ala Val	Ala Trp Ser Pro Ser	Gly		
	560		565		570
Ser His Val Val	Ser Val Asp Lys Gly	Cys Lys Ala Val Leu	Trp		
	575		580		585
Ala Gln Tyr					

<210> 32

<211> 326

<212> PRT
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Incyte ID No: 1821658CD1

<400> 32
 Met Lys Gln Asp Ala Ser Arg Asn Ala Ala Tyr Thr Val Asp Cys
 1 5 10 15
 Glu Asp Tyr Val His Val Val Glu Phe Asn Pro Phe Glu Asn Gly
 20 25 30
 Asp Ser Gly Asn Leu Ile Ala Tyr Gly Gly Asn Asn Tyr Val Val
 35 40 45
 Ile Gly Thr Cys Thr Phe Gln Glu Glu Glu Ala Asp Val Glu Gly
 50 55 60
 Ile Gln Tyr Lys Thr Leu Arg Thr Phe His His Gly Val Arg Val
 65 70 75
 Asp Gly Ile Ala Trp Ser Pro Glu Thr Arg Leu Asp Ser Leu Pro
 80 85 90
 Pro Val Ile Lys Phe Cys Thr Ser Ala Ala Asp Met Lys Ile Arg
 95 100 105
 Leu Phe Thr Ser Asp Leu Gln Asp Lys Asn Glu Tyr Lys Val Leu
 110 115 120
 Glu Gly His Thr Asp Phe Ile Asn Gly Leu Val Phe Asp Pro Lys
 125 130 135
 Glu Gly Gln Glu Ile Ala Ser Val Ser Asp Asp His Thr Cys Arg
 140 145 150
 Ile Trp Asn Leu Glu Gly Val Gln Thr Ala His Phe Val Leu His
 155 160 165
 Ser Pro Gly Met Ser Val Cys Trp His Pro Glu Glu Thr Phe Lys
 170 175 180
 Leu Met Val Ala Glu Lys Asn Gly Thr Ile Arg Phe Tyr Asp Leu
 185 190 195
 Leu Ala Gln Gln Ala Ile Leu Ser Leu Glu Ser Glu Gln Val Pro
 200 205 210
 Leu Met Ser Ala His Trp Cys Leu Lys Asn Thr Phe Lys Val Gly
 215 220 225
 Ala Val Ala Gly Asn Asp Trp Leu Ile Trp Asp Ile Thr Arg Ser
 230 235 240
 Ser Tyr Pro Gln Asn Lys Arg Pro Val His Met Asp Arg Ala Cys
 245 250 255
 Leu Phe Arg Trp Ser Thr Ile Ser Glu Asn Leu Phe Ala Thr Thr
 260 265 270
 Gly Tyr Pro Gly Lys Met Ala Ser Gln Phe Gln Ile His His Leu
 275 280 285
 Gly His Pro Gln Pro Ile Leu Met Gly Ser Val Ala Val Gly Ser
 290 295 300
 Gly Leu Ser Trp His Arg Thr Leu Pro Leu Cys Val Ile Gly Gly
 305 310 315
 Asp His Lys Leu Leu Phe Trp Val Thr Glu Val
 320 325

<210> 33
 <211> 453
 <212> PRT
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Incyte ID No: 1872574CD1

<400> 33
 Met Ala Arg Lys Val Val Ser Arg Lys Arg Lys Ala Pro Ala Ser

1	5	10	15
Pro Gly Ala Gly Ser	Asp Ala Gln Gly	Pro Gln Phe Gly Trp	Asp
20	25	30	
His Ser Leu His Lys	Arg Lys Arg Leu	Pro Pro Val Lys Arg	Ser
35	40	45	
Leu Val Tyr Tyr Leu	Lys Asn Arg Glu	Val Arg Leu Gln Asn	Glu
50	55	60	
Thr Ser Tyr Ser Arg	Val Leu His Gly Tyr	Ala Ala Gln Gln	Leu
65	70	75	
Pro Ser Leu Leu Lys	Glu Arg Glu Phe His	Leu Gly Thr Leu	Asn
80	85	90	
Lys Val Phe Ala Ser	Gln Trp Leu Asn His	Arg Gln Val Val	Cys
95	100	105	
Gly Thr Lys Cys Asn	Thr Leu Phe Val Val	Asp Val Gln Thr	Ser
110	115	120	
Gln Ile Thr Lys Ile	Pro Ile Leu Lys Asp	Arg Glu Pro Gly	Gly
125	130	135	
Val Thr Gln Gln Gly	Cys Gly Ile His Ala	Ile Glu Leu Asn	Pro
140	145	150	
Ser Arg Thr Leu Leu	Ala Thr Gly Gly Asp	Asn Pro Asn Ser	Leu
155	160	165	
Ala Ile Tyr Arg Leu	Pro Thr Leu Asp Pro	Val Cys Val Gly	Asp
170	175	180	
Asp Gly His Lys Asp	Trp Ile Phe Ser Ile	Ala Trp Ile Ser	Asp
185	190	195	
Thr Met Ala Val Ser	Gly Ser Arg Asp Gly	Ser Met Gly Leu	Trp
200	205	210	
Glu Val Thr Asp Asp	Val Leu Thr Lys Ser	Asp Ala Arg His	Asn
215	220	225	
Val Ser Arg Val Pro	Val Tyr Ala His Ile	Thr His Lys Ala	Leu
230	235	240	
Lys Asp Ile Pro Lys	Glu Asp Thr Asn Pro	Asp Asn Cys Lys	Val
245	250	255	
Arg Ala Leu Ala Phe	Asn Asn Lys Asn Lys	Glu Leu Gly Ala	Val
260	265	270	
Ser Leu Asp Gly Tyr	Phe His Leu Trp Lys	Ala Glu Asn Thr	Leu
275	280	285	
Ser Lys Leu Leu Ser	Thr Lys Leu Pro Tyr	Cys Arg Glu Asn	Val
290	295	300	
Cys Leu Ala Tyr Gly	Ser Glu Trp Ser Val	Tyr Ala Val Gly	Ser
305	310	315	
Gln Ala His Val Ser	Phe Leu Asp Pro Arg	Gln Pro Ser Tyr	Asn
320	325	330	
Val Lys Ser Val Cys	Ser Arg Glu Arg Gly	Ser Gly Ile Arg	Ser
335	340	345	
Val Ser Phe Tyr Glu	His Ile Ile Thr Val	Gly Thr Gly Gln	Gly
350	355	360	
Ser Leu Leu Phe Tyr	Asp Ile Arg Ala Gln	Arg Phe Leu Glu	Glu
365	370	375	
Arg Leu Ser Ala Cys	Tyr Gly Ser Lys Pro	Arg Leu Ala Gly	Glu
380	385	390	
Asn Leu Lys Leu Thr	Gly Lys Gly Trp Leu	Asn His Asp	Glu
395	400	405	
Thr Trp Arg Asn Tyr	Phe Ser Asp Ile Asp	Phe Phe Pro Asn	Ala
410	415	420	
Val Tyr Thr His Cys	Tyr Asp Ser Ser Gly	Thr Lys Leu Phe	Val
425	430	435	
Ala Gly Gly Pro Leu	Pro Ser Gly Leu His	Gly Asn Tyr Ala	Gly
440	445	450	
Leu Trp Ser			

<210> 34

<211> 161

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2590967CD1

<400> 34

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Met Ala Thr Glu Gly Gly Gly Lys Glu Met Asn Glu Ile Lys Thr
 1          5          10          15
Gln Phe Thr Thr Arg Glu Gly Leu Tyr Lys Leu Leu Pro His Ser
          20          25          30
Glu Tyr Ser Arg Pro Asn Arg Val Pro Phe Asn Ser Gln Gly Ser
          35          40          45
Asn Pro Val Arg Val Ser Phe Val Asn Leu Asn Asp Gln Ser Gly
          50          55          60
Asn Gly Asp Arg Leu Cys Phe Asn Val Gly Arg Glu Leu Tyr Phe
          65          70          75
Tyr Ile Tyr Lys Gly Val Arg Lys Ala Ala Asp Leu Ser Lys Pro
          80          85          90
Ile Asp Lys Arg Ile Tyr Lys Gly Thr Gln Pro Thr Cys His Asp
          95          100          105
Phe Asn His Leu Thr Ala Thr Ala Glu Ser Val Ser Leu Leu Val
          110          115          120
Gly Phe Ser Ala Gly Gln Val Gln Leu Ile Asp Pro Ile Lys Lys
          125          130          135
Glu Thr Ser Lys Leu Phe Asn Glu Glu Gly Ser Leu Ser Ser Pro
          140          145          150
Ser Gln Ala Ser Ser Pro Gly Gly Thr Val Val
          155          160

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<210> 35

<211> 684

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2824491CD1

<400> 35

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Met Ala Arg His Arg Asn Val Arg Gly Tyr Asn Tyr Asp Glu Asp
 1          5          10          15
Phe Glu Asp Asp Asp Leu Tyr Gly Gln Ser Val Glu Asp Asp Tyr
          20          25          30
Cys Ile Ser Pro Ser Thr Ala Ala Gln Phe Ile Tyr Ser Arg Arg
          35          40          45
Asp Lys Pro Ser Val Glu Pro Val Glu Tyr Asp Tyr Glu Asp
          50          55          60
Leu Lys Glu Ser Ser Asn Ser Val Ser Asn His Gln Leu Ser Gly
          65          70          75
Phe Asp Gln Ala Arg Leu Tyr Ser Cys Leu Asp His Met Arg Glu
          80          85          90
Val Leu Gly Asp Ala Val Pro Asp Glu Ile Leu Ile Glu Ala Val
          95          100          105
Leu Lys Asn Lys Phe Asp Val Gln Lys Ala Leu Ser Gly Val Leu
          110          115          120
Glu Gln Asp Arg Val Gln Ser Leu Lys Asp Lys Asn Glu Ala Thr
          125          130          135
Val Ser Thr Gly Lys Ile Ala Lys Gly Lys Pro Val Asp Ser Gln
          140          145          150
Thr Ser Arg Ser Glu Ser Glu Ile Val Pro Lys Val Ala Lys Met
          155          160          165
Thr Val Ser Gly Lys Lys Gln Thr Met Gly Phe Glu Val Pro Gly

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	170		175		180
Val Ser Ser Glu	Glu Asn Gly His Ser	Phe His Thr Pro Gln	Lys		
	185		190		195
Gly Pro Pro Ile	Glu Asp Ala Ile Ala	Ser Ser Asp Val Leu	Glu		
	200		205		210
Thr Ala Ser Lys	Ser Ala Asn Pro Pro	His Thr Ile Gln Ala	Ser		
	215		220		225
Glu Glu Gln Ser	Ser Thr Pro Ala Pro	Val Lys Lys Ser Gly	Lys		
	230		235		240
Leu Arg Gln Gln	Ile Asp Val Lys Ala	Glu Leu Glu Lys Arg	Gln		
	245		250		255
Gly Gly Lys Gln	Leu Leu Asn Leu Val	Val Ile Gly His Val	Asp		
	260		265		270
Ala Gly Lys Ser	Thr Leu Met Gly His	Met Leu Tyr Leu Leu	Gly		
	275		280		285
Asn Ile Asn Lys	Arg Thr Met His Lys	Tyr Glu Gln Glu Ser	Lys		
	290		295		300
Lys Ala Gly Lys	Ala Ser Phe Ala Tyr	Ala Trp Val Leu Asp	Glu		
	305		310		315
Thr Gly Glu Glu	Arg Glu Arg Gly Val	Thr Met Asp Val Gly	Met		
	320		325		330
Thr Lys Phe Glu	Thr Thr Lys Val	Ile Thr Leu Met Asp	Ala		
	335		340		345
Pro Gly His Lys	Asp Phe Ile Pro Asn	Met Ile Thr Gly Ala	Ala		
	350		355		360
Gln Ala Asp Val	Ala Val Leu Val Val	Asp Ala Ser Arg Gly	Glu		
	365		370		375
Phe Glu Ala Gly	Phe Glu Thr Gly Gly	Gln Thr Arg Glu His	Gly		
	380		385		390
Leu Leu Val Arg	Ser Leu Gly Val Thr	Gln Leu Ala Val Ala	Val		
	395		400		405
Asn Lys Met Asp	Gln Val Asn Trp Gln	Gln Glu Arg Phe Gln	Glu		
	410		415		420
Ile Thr Gly Lys	Leu Gly His Phe Leu	Lys Gln Ala Gly Phe	Lys		
	425		430		435
Glu Ser Asp Val	Gly Phe Ile Pro Thr	Ser Gly Leu Ser Gly	Glu		
	440		445		450
Asn Leu Ile Thr	Arg Ser Gln Ser Ser	Glu Leu Thr Lys Trp	Tyr		
	455		460		465
Lys Gly Leu Cys	Leu Leu Glu Gln Ile	Asp Ser Phe Lys Pro	Pro		
	470		475		480
Gln Arg Ser Ile	Asp Lys Pro Phe Arg	Leu Cys Val Ser Asp	Val		
	485		490		495
Phe Lys Asp Gln	Gly Ser Gly Phe Cys	Ile Thr Gly Lys Ile	Glu		
	500		505		510
Ala Gly Tyr Ile	Gln Thr Gly Asp Arg	Leu Leu Ala Met Pro	Pro		
	515		520		525
Asn Glu Thr Cys	Thr Val Lys Gly Ile	Thr Leu His Asp Glu	Pro		
	530		535		540
Val Asp Trp Ala	Ala Ala Gly Asp His	Val Ser Leu Thr Leu	Val		
	545		550		555
Gly Met Asp Ile	Ile Lys Ile Asn Val	Gly Cys Ile Phe Cys	Gly		
	560		565		570
Pro Lys Val Pro	Ile Lys Ala Cys Thr	Arg Phe Arg Ala Arg	Ile		
	575		580		585
Leu Ile Phe Asn	Ile Glu Ile Pro Ile	Thr Lys Gly Phe Pro	Val		
	590		595		600
Leu Leu His Tyr	Gln Thr Val Ser Glu	Pro Ala Val Ile Lys	Arg		
	605		610		615
Leu Ile Ser Val	Leu Asn Lys Ser Thr	Gly Glu Val Thr Lys	Lys		
	620		625		630
Lys Pro Lys Phe	Leu Thr Lys Gly Gln	Asn Ala Leu Val Glu	Leu		
	635		640		645

Gln Thr Gln Arg Pro Ile Ala Leu Glu Leu Tyr Lys Asp Phe Lys
 650 655 660
 Glu Leu Gly Arg Phe Met Leu Arg Tyr Gly Gly Ser Thr Ile Ala
 665 670 675
 Ala Gly Val Val Thr Glu Ile Lys Glu
 680

<210> 36

<211> 366

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2825460CD1

<400> 36

Met Ala Ala Ala Ala Ala Arg Trp Asn His Val Trp Val Gly Thr
 1 5 10 15
 Glu Thr Gly Ile Leu Lys Gly Val Asn Leu Gln Arg Lys Gln Ala
 20 25 30
 Ala Asn Phe Thr Ala Gly Gly Gln Pro Arg Arg Glu Glu Ala Val
 35 40 45
 Ser Ala Leu Cys Trp Gly Thr Gly Gly Glu Thr Gln Met Leu Val
 50 55 60
 Gly Cys Ala Asp Arg Thr Val Lys His Phe Ser Thr Glu Asp Gly
 65 70 75
 Ile Phe Gln Gly Gln Arg His Cys Pro Gly Gly Glu Gly Met Phe
 80 85 90
 Arg Gly Leu Ala Gln Ala Asp Gly Thr Leu Ile Thr Cys Val Asp
 95 100 105
 Ser Gly Ile Leu Arg Val Trp His Asp Lys Asp Lys Asp Thr Ser
 110 115 120
 Ser Asp Pro Leu Leu Glu Leu Arg Val Gly Pro Gly Val Cys Arg
 125 130 135
 Met Arg Gln Asp Pro Ala His Pro His Val Val Ala Thr Gly Gly
 140 145 150
 Lys Glu Asn Ala Leu Lys Ile Trp Asp Leu Gln Gly Ser Glu Glu
 155 160 165
 Pro Val Phe Arg Ala Lys Asn Val Arg Asn Asp Trp Leu Asp Leu
 170 175 180
 Arg Val Pro Ile Trp Asp Gln Asp Ile Gln Phe Leu Pro Gly Ser
 185 190 195
 Gln Lys Leu Val Thr Cys Thr Gly Tyr His Gln Val Arg Val Tyr
 200 205 210
 Asp Pro Ala Ser Pro Gln Arg Arg Pro Val Leu Glu Thr Thr Tyr
 215 220 225
 Gly Glu Tyr Pro Leu Thr Ala Met Thr Leu Thr Pro Gly Gly Asn
 230 235 240
 Ser Val Ile Val Gly Asn Thr His Gly Gln Leu Ala Glu Ile Asp
 245 250 255
 Leu Arg Gln Gly Arg Leu Leu Gly Cys Leu Lys Gly Leu Ala Gly
 260 265 270
 Ser Val Arg Gly Leu Gln Cys His Pro Ser Lys Pro Leu Leu Ala
 275 280 285
 Ser Cys Gly Leu Asp Arg Val Leu Arg Ile His Arg Ile Gln Asn
 290 295 300
 Pro Arg Gly Leu Glu His Lys Asp Glu Pro Gln Glu Pro Gln Glu
 305 310 315
 Pro Asn Lys Val Pro Leu Glu Asp Thr Glu Thr Asp Glu Leu Trp
 320 325 330
 Ala Ser Leu Glu Ala Ala Ala Lys Arg Lys Leu Ser Gly Leu Glu
 335 340 345
 Gln Pro Gln Gly Ala Leu Gln Thr Arg Arg Arg Lys Lys Lys Arg

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350                               355                               360
Pro Gly Ser Thr Ser Pro
365
<210> 37
<211> 339
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<223> Incyte ID No: 2871116CD1

<400> 37
Met Ala Thr Glu Ile Gly Ser Pro Pro Arg Phe Phe His Met Pro
 1          5          10          15
Arg Phe Gln His Gln Ala Pro Arg Gln Leu Phe Tyr Lys Arg Pro
 20          25          30
Asp Phe Ala Gln Gln Ala Met Gln Gln Leu Thr Phe Asp Gly
 35          40          45
Lys Arg Met Arg Lys Ala Val Asn Arg Lys Thr Ile Asp Tyr Asn
 50          55          60
Pro Ser Val Ile Lys Tyr Leu Glu Asn Arg Ile Trp Gln Arg Asp
 65          70          75
Gln Arg Asp Met Arg Ala Ile Gln Pro Asp Ala Gly Tyr Tyr Asn
 80          85          90
Asp Leu Val Pro Pro Ile Gly Met Leu Asn Asn Pro Met Asn Ala
 95          100         105
Val Thr Thr Lys Phe Val Arg Thr Ser Thr Asn Lys Val Lys Cys
 110         115         120
Pro Val Phe Val Val Arg Leu Gln Glu Glu Phe Glu Ser Leu Ser
 125         130         135
Val Leu Lys Ser Trp Thr Pro Glu Gly Arg Arg Leu Val Thr Gly
 140         145         150
Ala Ser Ser Gly Glu Phe Thr Leu Trp Asn Gly Leu Thr Phe Asn
 155         160         165
Phe Glu Thr Ile Leu Gln Ala His Asp Ser Pro Val Arg Ala Met
 170         175         180
Thr Trp Ser His Asn Asp Met Trp Met Leu Thr Ala Asp His Gly
 185         190         195
Gly Tyr Val Lys Tyr Trp Gln Ser Asn Met Asn Asn Val Lys Met
 200         205         210
Phe Gln Ala His Lys Glu Ala Ile Arg Glu Ala Arg Phe Ile His
 215         220         225
Asn Ile Pro Phe Ser Val Val Pro Ile Val Met Val Lys Leu Phe
 230         235         240
Ser Lys Cys Ile Leu Gly Ala Glu Met His Gly Leu Cys Gln Phe
 245         250         255
Leu Gly Asn Phe Leu His Pro Ile Asn Thr Ile Phe Phe Phe Val
 260         265         270
Phe Thr His Ser Pro Phe Cys Trp His Leu Ser Glu Val Val Leu
 275         280         285
Ser Arg Tyr Gln Pro Leu Gln Tyr Val Arg Asp Val Leu Ser Ala
 290         295         300
Ala Phe Cys Thr Gly Phe Leu Phe Ser Phe Met Ile Asn Asn Val
 305         310         315
Tyr Thr Leu Phe Leu Phe Ile Ile Tyr Cys Val Arg Gln Glu Tyr
 320         325         330
Phe Ile Pro Asn Lys Glu Phe Ser Leu
 335
<210> 38
<211> 213
<212> PRT
<213> Homo sapiens

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<220>
 <221> misc_feature
 <223> Incyte ID No: 2942212CD1

<400> 38
 Met Glu Ala Ile Trp Leu Tyr Gln Phe Arg Leu Ile Val Ile Gly
 1 5 10 15
 Asp Ser Thr Val Gly Lys Ser Cys Leu Ile Arg Arg Phe Thr Glu
 20 25 30
 Gly Arg Phe Ala Gln Val Ser Asp Pro Thr Val Gly Val Asp Phe
 35 40 45
 Phe Ser Arg Leu Val Glu Ile Glu Pro Gly Lys Arg Ile Lys Leu
 50 55 60
 Gln Ile Trp Asp Thr Ala Gly Gln Glu Arg Phe Arg Ser Ile Thr
 65 70 75
 Arg Ala Tyr Tyr Arg Asn Ser Val Gly Gly Leu Leu Leu Phe Ala
 80 85 90
 Ile Thr Asn Arg Arg Ser Phe Gln Asn Val His Glu Trp Leu Glu
 95 100 105
 Glu Thr Lys Val His Val Gln Pro Tyr Gln Ile Val Phe Val Leu
 110 115 120
 Val Gly His Lys Cys Asp Leu Asp Thr Gln Arg Gln Val Thr Arg
 125 130 135
 His Glu Ala Glu Lys Leu Ala Ala Ala Tyr Gly Met Lys Tyr Ile
 140 145 150
 Glu Thr Ser Ala Arg Asp Ala Ile Asn Val Glu Lys Ala Phe Thr
 155 160 165
 Asp Leu Thr Arg Asp Ile Tyr Glu Leu Val Lys Arg Gly Glu Ile
 170 175 180
 Thr Ile Gln Glu Gly Trp Glu Gly Val Lys Ser Gly Phe Val Pro
 185 190 195
 Asn Val Val His Ser Ser Glu Glu Val Val Lys Ser Glu Arg Arg
 200 205 210
 Cys Leu Cys

<210> 39
 <211> 393
 <212> PRT
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Incyte ID No: 3685151CD1

<400> 39
 Met Glu Leu Val Ala Gly Cys Tyr Glu Gln Val Leu Phe Gly Phe
 1 5 10 15
 Ala Val His Pro Glu Pro Glu Ala Cys Gly Asp His Glu Gln Gln
 20 25 30
 Trp Thr Leu Val Ala Asp Phe Thr His His Ala His Thr Ala Ser
 35 40 45
 Leu Ser Ala Val Ala Val Asn Ser Arg Phe Val Val Thr Gly Ser
 50 55 60
 Lys Asp Glu Thr Ile His Ile Tyr Asp Met Lys Lys Lys Ile Glu
 65 70 75
 His Gly Ala Leu Val His His Ser Gly Thr Ile Thr Cys Leu Thr
 80 85 90
 Phe Tyr Gly Asn Arg His Leu Ile Ser Gly Ala Glu Asp Gly Leu
 95 100 105
 Ile Cys Ile Trp Asp Ala Lys Lys Trp Glu Ser Leu Thr Ser Ile
 110 115 120
 Lys Ala His Lys Gly Gln Val Thr Phe Leu Ser Ile His Pro Ser
 125 130 135

Gly Lys Leu Ala Leu Ser Val Gly Thr Asp Lys Thr Leu Arg Thr
 140 145 150
 Trp Asn Leu Val Glu Gly Arg Ser Ala Phe Ile Lys Asn Ile Lys
 155 160 165
 Gln Asn Ala His Ile Val Glu Trp Ser Pro Arg Gly Glu Gln Tyr
 170 175 180
 Val Val Ile Ile Gln Asn Lys Ile Asp Ile Tyr Gln Leu Asp Thr
 185 190 195
 Ala Ser Ile Ser Gly Thr Ile Thr Asn Glu Lys Arg Ile Ser Ser
 200 205 210
 Val Lys Phe Leu Ser Glu Ser Val Leu Ala Val Ala Gly Asp Glu
 215 220 225
 Glu Val Ile Arg Phe Phe Asp Cys Asp Ser Leu Val Cys Leu Cys
 230 235 240
 Glu Phe Lys Ala His Glu Asn Arg Val Lys Asp Met Phe Ser Phe
 245 250 255
 Glu Ile Pro Glu His His Val Ile Val Ser Ala Ser Ser Asp Gly
 260 265 270
 Phe Ile Lys Met Trp Lys Leu Lys Gln Asp Lys Lys Val Pro Pro
 275 280 285
 Ser Leu Leu Cys Glu Ile Asn Thr Asn Ala Arg Leu Thr Cys Leu
 290 295 300
 Gly Val Trp Leu Asp Lys Val Ala Asp Met Lys Glu Ser Leu Pro
 305 310 315
 Pro Ala Ala Glu Pro Ser Pro Val Ser Lys Glu Gln Ser Lys Ile
 320 325 330
 Gly Lys Lys Glu Pro Gly Asp Thr Val His Lys Glu Glu Lys Arg
 335 340 345
 Ser Lys Pro Asn Thr Lys Lys Arg Gly Leu Thr Gly Asp Ser Lys
 350 355 360
 Lys Ala Thr Lys Glu Ser Gly Leu Ile Ser Thr Lys Lys Arg Lys
 365 370 375
 Met Val Glu Met Leu Glu Lys Lys Arg Lys Lys Lys Lys Ile Lys
 380 385 390
 Thr Met Gln

<210> 40

<211> 399

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 4881515CD1

<400> 40

Met Ser Leu Gln Tyr Gly Ala Glu Glu Thr Pro Leu Ala Gly Ser
 1 5 10 15
 Tyr Gly Ala Ala Asp Ser Phe Pro Lys Asp Phe Gly Tyr Gly Val
 20 25 30
 Glu Glu Glu Glu Glu Glu Ala Ala Ala Gly Gly Gly Val Gly
 35 40 45
 Ala Gly Ala Gly Gly Gly Cys Gly Pro Gly Gly Ala Asp Ser Ser
 50 55 60
 Lys Pro Arg Ile Leu Leu Met Gly Leu Arg Arg Ser Gly Lys Ser
 65 70 75
 Ser Ile Gln Lys Val Val Phe His Lys Met Ser Pro Asn Glu Thr
 80 85 90
 Leu Phe Leu Glu Ser Thr Asn Lys Ile Tyr Lys Asp Asp Ile Ser
 95 100 105
 Asn Ser Ser Phe Val Asn Phe Gln Ile Trp Asp Phe Pro Gly Gln
 110 115 120
 Met Asp Phe Phe Asp Pro Thr Phe Asp Tyr Glu Met Ile Phe Arg

	125		130		135
Gly Thr Gly Ala	Leu Ile Tyr Val Ile	Asp Ala Gln Asp Asp Tyr			
	140		145		150
Met Glu Ala Leu	Thr Arg Leu His Ile	Thr Val Ser Lys Ala Tyr			
	155		160		165
Lys Val Asn Pro	Asp Met Asn Phe Glu Val	Phe Ile His Lys Val			
	170		175		180
Asp Gly Leu Ser	Asp Asp His Lys Ile	Glu Thr Gln Arg Asp Ile			
	185		190		195
His Gln Arg Ala	Asn Asp Asp Leu Ala	Asp Ala Gly Leu Glu Lys			
	200		205		210
Leu His Leu Ser	Phe Tyr Leu Thr Ser	Ile Tyr Asp His Ser Ile			
	215		220		225
Phe Glu Ala Phe	Ser Lys Val Val Gln	Lys Leu Ile Pro Gln Leu			
	230		235		240
Pro Thr Leu Glu	Asn Leu Leu Asn Ile	Phe Ile Ser Asn Ser Gly			
	245		250		255
Ile Glu Lys Ala	Phe Leu Phe Asp Val	Val Ser Lys Ile Tyr Ile			
	260		265		270
Ala Thr Asp Ser	Ser Pro Val Asp Met	Gln Ser Tyr Glu Leu Cys			
	275		280		285
Cys Asp Met Ile	Asp Val Val Ile Asp	Val Ser Cys Ile Tyr Gly			
	290		295		300
Leu Lys Glu Asp	Gly Ser Gly Ser Ala	Tyr Asp Lys Glu Ser Met			
	305		310		315
Ala Ile Ile Lys	Leu Asn Asn Thr Thr	Val Leu Tyr Leu Lys Glu			
	320		325		330
Val Thr Lys Phe	Leu Ala Leu Val Cys	Ile Leu Arg Glu Glu Ser			
	335		340		345
Phe Glu Arg Lys	Gly Leu Ile Asp Tyr	Asn Phe His Cys Phe Arg			
	350		355		360
Lys Ala Ile His	Glu Val Phe Glu Val	Gly Val Thr Ser His Arg			
	365		370		375
Ser Cys Gly His	Gln Thr Ser Ala Ser	Ser Leu Lys Ala Leu Thr			
	380		385		390
His Asn Gly Thr	Pro Arg Asn Ala Ile				
	395				

<210> 41

<211> 412

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 5324681CD1

<400> 41

Met Ala Gly Ser Val	Gly Leu Ala Leu Cys	Gly Gln Thr Leu Val
1	5	10
Val Arg Gly Gly Ser	Arg Phe Leu Ala Thr	Ser Ile Ala Ser Ser
	20	25
Asp Asp Asp Ser Leu	Phe Ile Tyr Asp Cys	Ser Ala Ala Glu Lys
	35	40
Lys Ser Gln Glu Asn	Lys Gly Glu Asp Ala	Pro Leu Asp Gln Gly
	50	55
Ser Gly Ala Ile Leu	Ala Ser Thr Phe Ser	Lys Ser Gly Ser Tyr
	65	70
Phe Ala Leu Thr Asp	Asp Ser Lys Arg Leu	Ile Leu Phe Arg Thr
	80	85
Lys Pro Trp Gln Cys	Leu Ser Val Arg Thr	Val Ala Arg Arg Cys
	95	100
Thr Ala Leu Thr Phe	Ile Ala Ser Glu Glu	Lys Val Leu Val Ala
	110	115

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Asp Lys Ser Gly Asp Val Tyr Ser Phe Ser Val Leu Glu Pro His
125 130 135
Gly Cys Gly Arg Leu Glu Leu Gly His Leu Ser Met Leu Leu Asp
140 145 150
Val Ala Val Ser Pro Asp Asp Arg Phe Ile Leu Thr Ala Asp Arg
155 160 165
Asp Glu Lys Ile Arg Val Ser Trp Ala Ala Ala Pro His Ser Ile
170 175 180
Glu Ser Phe Cys Leu Gly His Thr Glu Phe Val Ser Arg Ile Ser
185 190 195
Val Val Pro Thr Gln Pro Gly Leu Leu Leu Ser Ser Ser Gly Asp
200 205 210
Gly Thr Leu Arg Leu Trp Glu Tyr Arg Ser Gly Arg Gln Leu His
215 220 225
Cys Cys His Leu Ala Ser Leu Gln Glu Leu Val Asp Pro Gln Ala
230 235 240
Pro Gln Lys Phe Ala Ala Ser Arg Ile Ala Phe Trp Cys Gln Glu
245 250 255
Asn Cys Val Ala Leu Leu Cys Asp Gly Thr Pro Val Val Tyr Ile
260 265 270
Phe Gln Leu Asp Ala Arg Arg Gln Gln Leu Val Tyr Arg Gln Gln
275 280 285
Leu Ala Phe Gln His Gln Val Trp Asp Val Ala Phe Glu Glu Thr
290 295 300
Gln Gly Leu Trp Val Leu Gln Asp Cys Gln Glu Ala Pro Leu Val
305 310 315
Leu Tyr Arg Pro Val Gly Asp Gln Trp Gln Ser Val Pro Glu Ser
320 325 330
Thr Val Leu Lys Lys Val Ser Gly Val Leu Arg Gly Asn Trp Ala
335 340 345
Met Leu Glu Gly Ser Ala Gly Ala Asp Ala Ser Phe Ser Ser Leu
350 355 360
Tyr Lys Ala Thr Phe Asp Asn Val Thr Ser Tyr Leu Lys Lys Lys
365 370 375
Glu Glu Arg Leu Gln Gln Leu Glu Lys Lys Gln Arg Arg Arg
380 385 390
Ser Pro Pro Pro Gly Pro Asp Gly His Ala Lys Lys Met Arg Pro
395 400 405
Gly Glu Ala Thr Leu Ser Cys
410

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<210> 42

<211> 163

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 5387651CD1

<400> 42

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Met Asp Ala Leu Glu Gly Glu Ser Phe Ala Leu Ser Phe Ser Ser
1 5 10 15
Ala Ser Asp Ala Glu Phe Asp Ala Val Val Gly Tyr Leu Glu Asp
20 25 30
Ile Ile Met Asp Asp Glu Phe Gln Leu Leu Gln Arg Asn Phe Met
35 40 45
Asp Lys Tyr Tyr Leu Glu Phe Glu Asp Thr Glu Glu Asn Lys Leu
50 55 60
Ile Tyr Thr Pro Ile Phe Asn Glu Tyr Ile Ser Leu Val Glu Lys
65 70 75
Tyr Ile Glu Glu Gln Leu Leu Gln Arg Ile Pro Glu Phe Asn Met
80 85 90
Ala Ala Phe Thr Thr Thr Leu Gln His His Lys Asp Glu Val Ala

```

	95		100		105
Gly Asp Ile Phe	Asp Met Leu Leu Thr Phe	Thr Asp Phe Leu	Ala		
	110		115		120
Phe Lys Glu Met	Phe Leu Asp Tyr Arg	Ala Glu Lys Glu Gly	Arg		
	125		130		135
Gly Leu Asp Leu	Ser Ser Gly Leu Val	Val Thr Ser Leu Cys	Lys		
	140		145		150
Ser Ser Ser Leu	Pro Ala Ser Gln Asn	Asn Leu Arg His			
	155		160		

<210> 43

<211> 514

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 5595679CD1

<400> 43

Met Gln Glu Ser Gly	Cys Arg Leu Glu His	Pro Ser Ala Thr Lys	
1	5	10	15
Phe Arg Asn His Val	Met Glu Gly Asp Trp	Asp Lys Ala Glu Asn	
	20	25	30
Asp Leu Asn Glu Leu	Lys Pro Leu Val His	Ser Pro His Ala Ile	
	35	40	45
Val Val Arg Gly Ala	Leu Glu Ile Ser Gln	Thr Leu Leu Gly Ile	
	50	55	60
Ile Val Arg Met Lys	Phe Leu Leu Leu Gln	Gln Lys Tyr Leu Glu	
	65	70	75
Tyr Leu Glu Asp Gly	Lys Val Leu Glu Ala	Leu Gln Val Leu Arg	
	80	85	90
Cys Glu Leu Thr Pro	Leu Lys Tyr Asn Thr	Glu Arg Ile His Val	
	95	100	105
Leu Ser Gly Tyr Leu	Met Cys Ser His Ala	Glu Asp Leu Arg Ala	
	110	115	120
Lys Ala Glu Trp Glu	Gly Lys Gly Thr Ala	Ser Arg Ser Lys Leu	
	125	130	135
Leu Asp Lys Leu Gln	Thr Tyr Leu Pro Pro	Ser Val Met Leu Pro	
	140	145	150
Pro Arg Arg Leu Gln	Thr Leu Leu Arg Gln	Ala Val Glu Leu Gln	
	155	160	165
Arg Asp Arg Cys Leu	Tyr His Asn Thr Lys	Leu Asp Asn Asn Leu	
	170	175	180
Asp Ser Val Ser Leu	Leu Ile Asp His Val	Cys Ser Arg Arg Gln	
	185	190	195
Phe Pro Cys Tyr Thr	Gln Gln Ile Leu Thr	Glu His Cys Asn Glu	
	200	205	210
Val Trp Phe Cys Lys	Phe Ser Asn Asp Gly	Thr Lys Leu Ala Thr	
	215	220	225
Gly Ser Lys Asp Thr	Thr Val Ile Ile Trp	Gln Val Asp Pro Asp	
	230	235	240
Thr His Leu Leu Lys	Leu Leu Lys Thr Leu	Glu Gly His Ala Tyr	
	245	250	255
Gly Val Ser Tyr Ile	Ala Trp Ser Pro Asp	Asp Asn Tyr Leu Val	
	260	265	270
Ala Cys Gly Pro Asp	Asp Cys Ser Glu Leu	Trp Leu Trp Asn Val	
	275	280	285
Gln Thr Gly Glu Leu	Arg Thr Lys Met Ser	Gln Ser His Glu Asp	
	290	295	300
Ser Leu Thr Ser Val	Ala Trp Asn Pro Asp	Gly Lys Arg Phe Val	
	305	310	315
Thr Gly Gly Gln Arg	Gly Gln Phe Tyr Gln	Cys Asp Leu Asp Gly	
	320	325	330

```

Asn Leu Leu Asp Ser Trp Glu Gly Val Arg Val Gln Cys Leu Trp
      335                      340                      345
Cys Leu Ser Asp Gly Lys Thr Val Leu Ala Ser Asp Thr His Gln
      350                      355                      360
Arg Ile Arg Gly Tyr Asn Phe Glu Asp Leu Thr Asp Arg Asn Ile
      365                      370                      375
Val Gln Glu Asp His Pro Ile Met Ser Phe Thr Ile Ser Lys Asn
      380                      385                      390
Gly Arg Leu Ala Leu Leu Asn Val Ala Thr Gln Gly Val His Leu
      395                      400                      405
Trp Asp Leu Gln Asp Arg Val Leu Val Arg Lys Tyr Gln Gly Val
      410                      415                      420
Thr Gln Gly Phe Tyr Thr Ile His Ser Cys Phe Gly Gly His Asn
      425                      430                      435
Glu Asp Phe Ile Ala Ser Gly Ser Glu Asp His Lys Val Tyr Ile
      440                      445                      450
Trp His Lys Arg Ser Glu Leu Pro Ile Ala Glu Leu Thr Gly His
      455                      460                      465
Thr Arg Thr Val Asn Cys Val Ser Trp Asn Pro Gln Ile Pro Ser
      470                      475                      480
Met Met Ala Ser Ala Ser Asp Asp Gly Thr Val Arg Ile Trp Gly
      485                      490                      495
Pro Ala Pro Phe Ile Asp His Gln Asn Ile Glu Glu Glu Cys Ser
      500                      505                      510
Ser Met Asp Ser

```

<210> 44

<211> 67

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 5782457CD1

<400> 44

```

Met Glu Glu Trp Asp Val Pro Gln Met Lys Lys Glu Val Glu Ser
  1      5      10      15
Leu Lys Tyr Gln Leu Ala Phe Gln Arg Glu Met Ala Ser Lys Thr
      20      25      30
Ile Pro Glu Leu Leu Lys Trp Ile Glu Asp Gly Ile Pro Lys Asp
      35      40      45
Pro Phe Leu Asn Pro Asp Leu Met Lys Asn Asn Pro Trp Val Glu
      50      55      60
Lys Gly Lys Cys Thr Ile Leu
      65

```

<210> 45

<211> 315

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 760677CD1

<400> 45

```

Met Ala Phe Pro Glu Pro Lys Pro Arg Pro Pro Glu Leu Pro Gln
  1      5      10      15
Lys Arg Leu Lys Thr Leu Asp Cys Gly Gln Gly Ala Val Arg Ala
      20      25      30
Val Arg Phe Asn Val Asp Gly Asn Tyr Cys Leu Thr Cys Gly Ser
      35      40      45
Asp Lys Thr Leu Lys Leu Trp Asn Pro Leu Arg Gly Thr Leu Leu

```

50	55	60
Arg Thr Tyr Ser Gly His Gly Tyr Glu Val Leu Asp Ala Ala Gly		
65	70	75
Ser Phe Asp Asn Ser Ser Leu Cys Ser Gly Gly Gly Asp Lys Ala		
80	85	90
Val Val Leu Trp Asn Val Ala Ser Gly Gln Val Val Arg Lys Phe		
95	100	105
Arg Gly His Ala Gly Lys Val Asn Thr Val Gln Phe Ser Glu Glu		
110	115	120
Ala Thr Val Ile Leu Ser Gly Ser Ile Asp Ser Ser Ile Arg Cys		
125	130	135
Trp Asp Cys Arg Ser Arg Arg Pro Glu Pro Val Gln Thr Leu Asp		
140	145	150
Glu Ala Arg Asp Gly Val Ser Ser Val Lys Val Ser Asp His Glu		
155	160	165
Ile Leu Ala Gly Ser Val Asp Gly Arg Val Arg Arg Tyr Asp Leu		
170	175	180
Arg Met Gly Gln Leu Phe Ser Asp Tyr Val Gly Ser Pro Ile Thr		
185	190	195
Cys Thr Cys Phe Ser Arg Asp Gly Gln Cys Thr Leu Val Ser Ser		
200	205	210
Leu Asp Ser Thr Leu Arg Leu Leu Asp Lys Asp Thr Gly Glu Leu		
215	220	225
Leu Gly Glu Tyr Lys Gly His Lys Asn Gln Glu Tyr Lys Leu Asp		
230	235	240
Cys Cys Leu Ser Glu Arg Asp Thr His Val Val Ser Cys Ser Glu		
245	250	255
Asp Gly Lys Val Phe Phe Trp Asp Leu Val Glu Gly Ala Leu Ala		
260	265	270
Leu Ala Leu Pro Val Gly Ser Gly Val Val Gln Ser Leu Asp Tyr		
275	280	285
His Pro Thr Glu Pro Cys Leu Leu Thr Ala Met Gly Gly Ser Val		
290	295	300
Gln Cys Trp Arg Glu Glu Ala Tyr Glu Ala Glu Asp Gly Ala Gly		
305	310	315

<210> 46

<211> 504

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1348567CD1

<400> 46

Met Ser Leu Ile Cys Ser Ile Ser Asn Glu Val Pro Glu His Pro		
1	5	10
Cys Val Ser Pro Val Ser Asn His Val Tyr Glu Arg Arg Leu Ile		
20	25	30
Glu Lys Tyr Ile Ala Glu Asn Gly Thr Asp Pro Ile Asn Asn Gln		
35	40	45
Pro Leu Ser Glu Glu Gln Leu Ile Asp Ile Lys Val Ala His Pro		
50	55	60
Ile Arg Pro Lys Pro Pro Ser Ala Thr Ser Ile Pro Ala Ile Leu		
65	70	75
Lys Ala Leu Gln Asp Glu Trp Asp Ala Val Met Pro His Ser Phe		
80	85	90
Thr Leu Arg Gln Gln Leu Gln Thr Thr Arg Gln Glu Leu Ser His		
95	100	105
Ala Leu Tyr Gln His Asp Ala Ala Cys Arg Val Ile Ala Arg Leu		
110	115	120
Thr Lys Glu Val Thr Ala Ala Arg Glu Ala Leu Ala Thr Leu Lys		

```

Pro Gln Ala Gly 125      130      135
Leu Ile Val Pro Gln Ala Val Pro Ser Ser Gln
140      145
Pro Ser Val Val Gly Ala Gly Glu Pro Met Asp Leu Gly Glu Leu
155      160      165
Val Gly Met Thr Pro Glu Ile Ile Gln Lys Leu Gln Asp Lys Ala
170      175      180
Thr Val Leu Thr Thr Glu Arg Lys Lys Arg Gly Lys Thr Val Pro
185      190      195
Glu Glu Leu Val Lys Pro Glu Glu Leu Ser Lys Tyr Arg Gln Val
200      205      210
Ala Ser His Val Gly Leu His Ser Ala Ser Ile Pro Gly Ile Leu
215      220      225
Ala Leu Asp Leu Cys Pro Ser Asp Thr Asn Lys Ile Leu Thr Gly
230      235      240
Gly Ala Asp Lys Asn Val Val Val Phe Asp Lys Ser Ser Glu Gln
245      250      255
Ile Leu Ala Thr Leu Lys Gly His Thr Lys Lys Val Thr Ser Val
260      265      270
Val Phe His Pro Ser Gln Asp Leu Val Phe Ser Ala Ser Pro Asp
275      280      285
Ala Thr Ile Arg Ile Trp Ser Val Pro Asn Ala Ser Cys Val Gln
290      295      300
Val Val Arg Ala His Glu Ser Ala Val Thr Gly Leu Ser Leu His
305      310      315
Ala Thr Gly Asp Tyr Leu Leu Ser Ser Ser Asp Asp Gln Tyr Trp
320      325      330
Ala Phe Ser Asp Ile Gln Thr Gly Arg Val Leu Thr Lys Val Thr
335      340      345
Asp Glu Thr Ser Gly Cys Ser Leu Thr Cys Ala Gln Phe His Pro
350      355      360
Asp Gly Leu Ile Phe Gly Thr Gly Thr Met Asp Ser Gln Ile Lys
365      370      375
Ile Trp Asp Leu Lys Glu Arg Thr Asn Val Ala Asn Phe Pro Gly
380      385      390
His Ser Gly Pro Ile Thr Ser Ile Ala Phe Ser Glu Asn Gly Tyr
395      400      405
Tyr Leu Ala Thr Ala Ala Asp Asp Ser Ser Val Lys Leu Trp Asp
410      415      420
Leu Arg Lys Leu Lys Asn Phe Lys Thr Leu Gln Leu Asp Asn Asn
425      430      435
Phe Glu Val Lys Ser Leu Ile Phe Asp Gln Ser Gly Thr Tyr Leu
440      445      450
Ala Leu Gly Gly Thr Asp Val Gln Ile Tyr Ile Cys Lys Gln Trp
455      460      465
Thr Glu Ile Leu His Phe Thr Glu His Ser Gly Leu Thr Thr Gly
470      475      480
Val Ala Phe Gly His His Ala Lys Phe Ile Ala Ser Thr Gly Met
485      490      495
Asp Arg Ser Leu Lys Phe Tyr Ser Leu
500

<210> 47
<211> 522
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<223> Incyte ID No: 1751354CD1

<400> 47
Met Ala Phe Leu Asp Asn Pro Thr Ile Ile Leu Ala His Ile Arg
1          5          10          15

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Gln	Ser	His	Val	Thr	Ser	Asp	Asp	Thr	Gly	Met	Cys	Glu	Met	Val
				20					25					30
Leu	Ile	Asp	His	Asp	Val	Asp	Leu	Glu	Lys	Ile	His	Pro	Pro	Ser
				35					40					45
Met	Pro	Gly	Asp	Ser	Gly	Ser	Glu	Ile	Gln	Gly	Ser	Asn	Gly	Glu
				50					55					60
Thr	Gln	Gly	Tyr	Val	Tyr	Ala	Gln	Ser	Val	Asp	Ile	Thr	Ser	Ser
				65					70					75
Trp	Asp	Phe	Gly	Ile	Arg	Arg	Arg	Ser	Asn	Thr	Ala	Gln	Arg	Leu
				80					85					90
Glu	Arg	Leu	Arg	Lys	Glu	Arg	Gln	Asn	Gln	Ile	Lys	Cys	Lys	Asn
				95					100					105
Ile	Gln	Trp	Lys	Glu	Arg	Asn	Ser	Lys	Gln	Ser	Ala	Gln	Glu	Leu
				110					115					120
Lys	Ser	Leu	Phe	Glu	Lys	Lys	Ser	Leu	Lys	Glu	Lys	Pro	Pro	Ile
				125					130					135
Ser	Gly	Lys	Gln	Ser	Ile	Leu	Ser	Val	Arg	Leu	Glu	Gln	Cys	Pro
				140					145					150
Leu	Gln	Leu	Asn	Asn	Pro	Phe	Asn	Glu	Tyr	Ser	Lys	Phe	Asp	Gly
				155					160					165
Lys	Gly	His	Val	Gly	Thr	Thr	Ala	Thr	Lys	Lys	Ile	Asp	Val	Tyr
				170					175					180
Leu	Pro	Leu	His	Ser	Ser	Gln	Asp	Arg	Leu	Leu	Pro	Met	Thr	Val
				185					190					195
Val	Thr	Met	Ala	Ser	Ala	Arg	Val	Gln	Asp	Leu	Ile	Gly	Leu	Ile
				200					205					210
Cys	Trp	Gln	Tyr	Thr	Ser	Glu	Gly	Arg	Glu	Pro	Lys	Leu	Asn	Asp
				215					220					225
Asn	Val	Ser	Ala	Tyr	Cys	Leu	His	Ile	Ala	Glu	Asp	Asp	Gly	Glu
				230					235					240
Val	Asp	Thr	Asp	Phe	Pro	Pro	Leu	Asp	Ser	Asn	Glu	Pro	Ile	His
				245					250					255
Lys	Phe	Gly	Phe	Ser	Thr	Leu	Ala	Leu	Val	Glu	Lys	Tyr	Ser	Ser
				260					265					270
Pro	Gly	Leu	Thr	Ser	Lys	Glu	Ser	Leu	Phe	Val	Arg	Ile	Asn	Ala
				275					280					285
Ala	His	Gly	Phe	Ser	Leu	Ile	Gln	Val	Asp	Asn	Thr	Lys	Val	Thr
				290					295					300
Met	Lys	Glu	Ile	Leu	Leu	Lys	Ala	Val	Lys	Arg	Arg	Lys	Gly	Ser
				305					310					315
Gln	Lys	Val	Ser	Gly	Pro	Gln	Tyr	Arg	Leu	Glu	Lys	Gln	Ser	Glu
				320					325					330
Pro	Asn	Val	Ala	Val	Asp	Leu	Asp	Ser	Thr	Leu	Glu	Ser	Gln	Ser
				335					340					345
Ala	Trp	Glu	Phe	Cys	Leu	Val	Arg	Glu	Asn	Ser	Ser	Arg	Ala	Asp
				350					355					360
Gly	Val	Phe	Glu	Glu	Asp	Ser	Gln	Ile	Asp	Ile	Ala	Thr	Val	Gln
				365					370					375
Asp	Met	Leu	Ser	Ser	His	His	Tyr	Lys	Ser	Phe	Lys	Val	Ser	Met
				380					385					390
Ile	His	Arg	Leu	Arg	Phe	Thr	Thr	Asp	Val	Gln	Leu	Gly	Ile	Ser
				395					400					405
Gly	Asp	Lys	Val	Glu	Ile	Asp	Pro	Val	Thr	Asn	Gln	Lys	Ala	Ser
				410					415					420
Thr	Lys	Phe	Trp	Ile	Lys	Gln	Lys	Pro	Ile	Ser	Ile	Asp	Ser	Asp
				425					430					435
Leu	Leu	Cys	Ala	Cys	Asp	Leu	Ala	Glu	Glu	Lys	Ser	Pro	Ser	His
				440					445					450
Ala	Ile	Phe	Lys	Leu	Thr	Tyr	Leu	Ser	Asn	His	Asp	Tyr	Lys	His
				455					460					465
Leu	Tyr	Phe	Glu	Ser	Asp	Ala	Ala	Thr	Val	Asn	Glu	Ile	Val	Leu
				470					475					480
Lys	Val	Asn	Tyr	Ile	Leu	Glu	Ser	Arg	Ala	Ser	Thr	Ala	Arg	Ala

	485		490		495
Asp Tyr Phe Ala	Gln Lys Gln Arg Lys	Leu Asn Arg Arg Thr	Ser		
	500		505		510
Phe Ser Phe Gln	Lys Glu Lys Lys Ser	Gly Gln Gln			
	515		520		

<210> 48

<211> 316

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1976780CD1

<400> 48

Met Ala Ser Lys Asp	Lys Ser Ser Lys	Lys Asn Val Phe Glu Leu	
1	5	10	15
Lys Thr Arg Gln Gly	Thr Glu Leu Leu	Ile Gln Ser Asp Asn Asp	
	20	25	30
Thr Val Ile Asn Asp	Trp Phe Lys Val	Leu Ser Ser Thr Ile Asn	
	35	40	45
Asn Gln Ala Val Glu	Thr Asp Glu Gly	Ile Glu Glu Glu Ile Pro	
	50	55	60
Asp Ser Pro Gly Ile	Glu Lys His Asp	Lys Glu Lys Glu Gln Lys	
	65	70	75
Asp Pro Lys Lys Leu	Arg Ser Phe Lys	Val Ser Ser Ile Asp Ser	
	80	85	90
Ser Glu Gln Lys Lys	Thr Lys Lys Asn	Leu Lys Lys Phe Leu Thr	
	95	100	105
Arg Arg Pro Thr Leu	Gln Ala Val Arg	Glu Lys Gly Tyr Ile Lys	
	110	115	120
Asp Gln Val Phe Gly	Ser Asn Leu Ala	Asn Leu Cys Gln Arg Glu	
	125	130	135
Asn Gly Thr Val Pro	Lys Phe Val Lys	Leu Cys Ile Glu His Val	
	140	145	150
Glu Glu His Gly Leu	Asp Ile Asp Gly	Ile Tyr Arg Val Ser Gly	
	155	160	165
Asn Leu Ala Val Ile	Gln Lys Leu Arg	Phe Ala Val Asn His Asp	
	170	175	180
Glu Lys Leu Asp Leu	Asn Asp Ser Lys	Trp Glu Asp Ile His Val	
	185	190	195
Ile Thr Gly Ala Leu	Lys Met Phe Phe	Arg Glu Leu Pro Glu Pro	
	200	205	210
Leu Phe Thr Phe Asn	His Phe Asn Asp	Phe Val Asn Ala Ile Lys	
	215	220	225
Gln Glu Pro Arg Gln	Arg Val Ala Ala	Val Lys Asp Leu Ile Arg	
	230	235	240
Gln Leu Pro Lys Pro	Asn Gln Asp Thr	Met Gln Ile Leu Phe Arg	
	245	250	255
His Leu Arg Arg Val	Ile Glu Asn Gly	Glu Lys Asn Arg Met Thr	
	260	265	270
Tyr Gln Ser Ile Ala	Ile Val Phe Gly	Pro Thr Leu Leu Lys Pro	
	275	280	285
Glu Lys Glu Thr Gly	Asn Ile Ala Val	His Thr Val Tyr Gln Asn	
	290	295	300
Gln Ile Val Glu Leu	Ile Leu Leu Glu	Leu Ser Ser Ile Phe Gly	
	305	310	315

Arg

<210> 49

<211> 387

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2048234CD1

<400> 49

Met	Val	His	Cys	Ser	Cys	Val	Leu	Phe	Arg	Lys	Tyr	Gly	Asn	Phe	1	5	10	15
Ile	Asp	Lys	Leu	Arg	Leu	Phe	Thr	Arg	Gly	Gly	Ser	Gly	Gly	Met	20	25	30	35
Gly	Tyr	Pro	Arg	Leu	Gly	Gly	Glu	Gly	Gly	Lys	Gly	Gly	Asp	Val	40	45	50	55
Trp	Val	Val	Ala	Gln	Asn	Arg	Met	Thr	Leu	Lys	Gln	Leu	Lys	Asp	60	65	70	75
Arg	Tyr	Pro	Arg	Lys	Arg	Phe	Val	Ala	Gly	Val	Gly	Ala	Asn	Ser	80	85	90	95
Lys	Ile	Ser	Ala	Leu	Lys	Gly	Ser	Lys	Gly	Lys	Asp	Trp	Glu	Ile	100	105	110	115
Pro	Val	Pro	Val	Gly	Ile	Ser	Val	Thr	Asp	Glu	Asn	Gly	Lys	Ile	120	125	130	135
Ile	Gly	Glu	Leu	Ser	Lys	Glu	Asn	Asp	Arg	Ile	Leu	Val	Ala	Gln	140	145	150	155
Gly	Gly	Leu	Gly	Gly	Lys	Leu	Leu	Thr	Asn	Phe	Leu	Pro	Leu	Lys	160	165	170	175
Gly	Gln	Lys	Arg	Ile	Ile	His	Leu	Asp	Leu	Lys	Leu	Ile	Ala	Asp	180	185	190	195
Val	Gly	Leu	Val	Gly	Phe	Pro	Asn	Ala	Gly	Lys	Ser	Ser	Leu	Leu	200	205	210	215
Ser	Cys	Val	Ser	His	Ala	Lys	Pro	Ala	Ile	Ala	Asp	Tyr	Ala	Phe	220	225	230	235
Thr	Thr	Leu	Lys	Leu	Lys	Leu	Gly	Lys	Ile	Met	Tyr	Ser	Asp	Phe	240	245	250	255
Lys	Gln	Ile	Ser	Val	Ala	Asp	Leu	Pro	Gly	Leu	Ile	Glu	Gly	Ala	260	265	270	275
His	Met	Asn	Lys	Gly	Met	Gly	His	Lys	Phe	Leu	Lys	His	Ile	Glu	280	285	290	295
Arg	Thr	Arg	Gln	Leu	Leu	Phe	Val	Val	Asp	Ile	Ser	Gly	Phe	Gln	300	305	310	315
Leu	Ser	Ser	His	Thr	Gln	Tyr	Arg	Thr	Ala	Phe	Glu	Thr	Ile	Ile	320	325	330	335
Leu	Leu	Thr	Lys	Glu	Leu	Glu	Leu	Tyr	Lys	Glu	Glu	Leu	Gln	Thr	340	345	350	355
Lys	Pro	Ala	Leu	Leu	Ala	Val	Asn	Lys	Met	Asp	Leu	Pro	Asp	Ala	360	365	370	375
Gln	Asp	Lys	Phe	His	Glu	Leu	Met	Ser	Gln	Leu	Gln	Asn	Pro	Lys	380	385		
Asp	Phe	Leu	His	Leu	Phe	Glu	Lys	Asn	Met	Ile	Pro	Glu	Arg	Thr				
Val	Glu	Phe	Gln	His	Ile	Ile	Pro	Ile	Ser	Ala	Val	Thr	Gly	Glu				
Gly	Ile	Glu	Glu	Leu	Lys	Asn	Cys	Ile	Arg	Lys	Ser	Leu	Asp	Glu				
Gln	Ala	Asn	Gln	Glu	Asn	Asp	Ala	Leu	His	Lys	Lys	Gln	Leu	Leu				
Asn	Leu	Trp	Ile	Ser	Asp	Thr	Met	Ser	Ser	Thr	Glu	Pro	Pro	Ser				
Lys	His	Ala	Val	Thr	Ser	Lys	Met		Asp	Ile	Ile							

<210> 50

<211> 334

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2111754CD1

<400> 50

```

Met Pro Ser Gly Pro Arg Ala Ala Leu Arg Trp Ala Ser Pro Ser
 1          5          10          15
Gln Leu Val Ser Tyr His Val Leu Arg Asn Gly Ile Tyr Ala Cys
 20          25          30
Tyr Pro His Ser Leu Arg Pro Arg Thr Pro Leu Leu Cys Ala Ser
 35          40          45
Arg Asn Ile Lys Pro Arg Arg Ser Glu Leu Leu Gly Cys Pro Val
 50          55          60
Gly Cys Arg Gly Ser Leu Ser Glu Gln Arg Ile Cys Leu Leu Gly
 65          70          75
Cys Leu Val Arg Ala Ser Glu Lys Gly Val Ser Cys Cys Gln Leu
 80          85          90
Ser Val Gly Glu Leu Val His Val Ser Pro Leu Arg Ile Pro Thr
 95          100         105
Met Gly Asn Ala Ser Phe Gly Ser Lys Glu Gln Lys Leu Leu Lys
110          115         120
Arg Leu Arg Leu Leu Pro Ala Leu Leu Ile Leu Arg Ala Phe Lys
125          130         135
Pro His Arg Lys Ile Arg Asp Tyr Arg Val Val Val Val Gly Thr
140          145         150
Ala Gly Val Gly Lys Ser Thr Leu Leu His Lys Trp Ala Ser Gly
155          160         165
Asn Phe Arg His Glu Tyr Leu Pro Thr Ile Glu Asn Thr Tyr Cys
170          175         180
Gln Leu Leu Gly Cys Ser His Gly Val Leu Ser Leu His Ile Thr
185          190         195
Asp Ser Lys Ser Gly Asp Gly Asn Arg Ala Leu Gln Arg His Val
200          205         210
Ile Ala Arg Gly His Ala Phe Val Leu Val Tyr Ser Val Thr Lys
215          220         225
Lys Glu Thr Leu Glu Leu Lys Ala Phe Tyr Glu Leu Ile Cys
230          235         240
Lys Ile Lys Gly Asn Asn Leu His Lys Phe Pro Ile Val Leu Val
245          250         255
Gly Asn Lys Ser Asp Asp Thr His Arg Glu Val Ala Leu Asn Asp
260          265         270
Gly Ala Thr Cys Ala Met Glu Trp Asn Cys Ala Phe Met Glu Ile
275          280         285
Ser Ala Lys Thr Asp Val Asn Val Gln Glu Leu Phe His Met Leu
290          295         300
Leu Asn Tyr Lys Lys Lys Pro Thr Thr Gly Leu Gln Glu Pro Glu
305          310         315
Lys Lys Ser Gln Met Pro Asn Thr Thr Glu Lys Leu Leu Asp Lys
320          325         330
Cys Ile Ile Met

```

<210> 51

<211> 551

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2123286CD1

<400> 51

```

Met Glu Glu Glu Leu Pro Leu Phe Ser Gly Asp Ser Gly Lys Pro
 1          5          10          15
Val Gln Ala Thr Leu Ser Ser Leu Lys Met Leu Asp Val Gly Lys

```

	20		25		30									
Trp	Pro	Ile	Phe	Ser	Leu	Cys	Ser	Glu	Glu	Leu	Gln	Leu	Ile	
	35								40				45	
Arg	Gln	Ala	Cys	Val	Phe	Gly	Ser	Ala	Gly	Asn	Glu	Val	Leu	Tyr
	50								55					60
Thr	Thr	Val	Asn	Asp	Glu	Ile	Phe	Val	Leu	Gly	Thr	Asn	Cys	Cys
	65								70					75
Gly	Cys	Leu	Gly	Leu	Gly	Asp	Val	Gln	Ser	Thr	Ile	Glu	Pro	Arg
	80								85					90
Arg	Leu	Asp	Ser	Leu	Asn	Gly	Lys	Lys	Ile	Ala	Cys	Leu	Ser	Tyr
	95								100					105
Gly	Ser	Gly	Pro	His	Ile	Val	Leu	Ala	Thr	Thr	Glu	Gly	Glu	Val
	110								115					120
Phe	Thr	Trp	Gly	His	Asn	Ala	Tyr	Ser	Gln	Leu	Gly	Asn	Gly	Thr
	125								130					135
Thr	Asn	His	Gly	Leu	Val	Pro	Cys	His	Ile	Ser	Thr	Asn	Leu	Ser
	140								145					150
Asn	Lys	Gln	Val	Ile	Glu	Val	Ala	Cys	Gly	Ser	Tyr	His	Ser	Leu
	155								160					165
Val	Leu	Thr	Ser	Asp	Gly	Glu	Val	Phe	Ala	Trp	Gly	Tyr	Asn	Asn
	170								175					180
Ser	Gly	Gln	Val	Gly	Ser	Gly	Ser	Thr	Val	Asn	Gln	Pro	Ile	Pro
	185								190					195
Arg	Arg	Val	Thr	Gly	Cys	Leu	Gln	Asn	Lys	Val	Val	Val	Thr	Ile
	200								205					210
Ala	Cys	Gly	Gln	Met	Cys	Cys	Met	Ala	Val	Val	Asp	Thr	Gly	Glu
	215								220					225
Val	Tyr	Val	Trp	Gly	Tyr	Asn	Gly	Asn	Gly	Gln	Leu	Gly	Leu	Gly
	230								235					240
Asn	Ser	Gly	Asn	Gln	Pro	Thr	Pro	Cys	Arg	Val	Ala	Ala	Leu	Gln
	245								250					255
Gly	Ile	Arg	Val	Gln	Arg	Val	Ala	Cys	Gly	Tyr	Ala	His	Thr	Leu
	260								265					270
Val	Leu	Thr	Asp	Glu	Gly	Gln	Val	Tyr	Ala	Trp	Gly	Ala	Asn	Ser
	275								280					285
Tyr	Gly	Gln	Leu	Gly	Thr	Gly	Asn	Lys	Ser	Asn	Gln	Ser	Tyr	Pro
	290								295					300
Thr	Pro	Val	Thr	Val	Glu	Lys	Asp	Arg	Ile	Ile	Glu	Ile	Ala	Ala
	305								310					315
Cys	His	Ser	Thr	His	Thr	Ser	Ala	Ala	Lys	Thr	Gln	Gly	Gly	His
	320								325					330
Val	Tyr	Met	Trp	Gly	Gln	Cys	Arg	Gly	Gln	Ser	Val	Ile	Leu	Pro
	335								340					345
His	Leu	Thr	His	Phe	Ser	Cys	Thr	Asp	Asp	Val	Phe	Ala	Cys	Phe
	350								355					360
Ala	Thr	Pro	Ala	Val	Thr	Trp	Arg	Leu	Leu	Ser	Val	Glu	Pro	Asp
	365								370					375
Asp	His	Leu	Thr	Val	Ala	Glu	Ser	Leu	Lys	Arg	Glu	Phe	Asp	Asn
	380								385					390
Pro	Asp	Thr	Ala	Asp	Leu	Lys	Phe	Leu	Val	Asp	Gly	Lys	Tyr	Ile
	395								400					405
Tyr	Ala	His	Lys	Val	Leu	Leu	Lys	Ile	Arg	Cys	Glu	His	Phe	Arg
	410								415					420
Ser	Ser	Leu	Glu	Asp	Asn	Glu	Asp	Asp	Ile	Val	Glu	Met	Ser	Glu
	425								430					435
Phe	Ser	Tyr	Pro	Val	Tyr	Arg	Ala	Phe	Leu	Glu	Tyr	Leu	Tyr	Thr
	440								445					450
Asp	Ser	Ile	Ser	Leu	Ser	Pro	Glu	Glu	Ala	Val	Gly	Leu	Leu	Asp
	455								460					465
Leu	Ala	Thr	Phe	Tyr	Arg	Glu	Asn	Arg	Leu	Lys	Lys	Leu	Cys	Gln
	470								475					480
Gln	Thr	Ile	Lys	Gln	Gly	Ile	Cys	Glu	Glu	Asn	Ala	Ile	Ala	Leu
	485								490					495

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Leu Ser Ala Ala Val Lys Tyr Asp Ala Gln Asp Leu Glu Glu Phe
                    500                    505                    510
Cys Phe Arg Phe Cys Ile Asn His Leu Thr Val Val Thr Gln Thr
                    515                    520                    525
Ser Gly Phe Ala Glu Met Asp His Asp Leu Leu Lys Asn Phe Ile
                    530                    535                    540
Ser Lys Ala Ser Arg Val Gly Ala Phe Lys Asn
                    545                    550

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<210> 52
<211> 308
<212> PRT
<213> Homo sapiens

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<220>
<221> misc_feature
<223> Incyte ID No: 2477507CD1

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<400> 52
Met Ile His Asp Ala Gln Met Asp Tyr Tyr Gly Thr Arg Leu Ala
 1      5      10      15
Thr Cys Ser Ser Arg Ser Val Lys Ile Phe Asp Val Arg Asn
 20      25      30
Gly Gly Gln Ile Leu Ile Ala Asp Leu Arg Gly His Glu Gly Pro
 35      40      45
Val Trp Gln Val Ala Trp Ala His Pro Met Tyr Gly Asn Ile Leu
 50      55      60
Ala Ser Cys Ser Tyr Asp Arg Lys Val Ile Ile Trp Arg Glu Glu
 65      70      75
Asn Gly Thr Trp Glu Lys Ser His Glu His Ala Gly His Asp Ser
 80      85      90
Ser Val Asn Ser Val Cys Trp Ala Pro His Asp Tyr Gly Leu Ile
 95     100     105
Leu Ala Cys Gly Ser Ser Asp Gly Ala Ile Ser Leu Leu Thr Tyr
110     115     120
Thr Gly Glu Gly Gln Trp Glu Val Lys Lys Ile Asn Asn Ala His
125     130     135
Thr Ile Gly Cys Asn Ala Val Ser Trp Ala Pro Ala Val Val Pro
140     145     150
Gly Ser Leu Ile Asp His Pro Ser Gly Gln Lys Pro Asn Tyr Ile
155     160     165
Lys Arg Phe Ala Ser Gly Gly Cys Asp Asn Leu Ile Lys Leu Trp
170     175     180
Lys Glu Glu Glu Asp Gly Gln Trp Lys Glu Glu Gln Lys Leu Glu
185     190     195
Ala His Ser Asp Trp Val Arg Asp Val Ala Trp Ala Pro Ser Ile
200     205     210
Gly Leu Pro Thr Ser Thr Ile Ala Ser Cys Ser Gln Asp Gly Arg
215     220     225
Val Phe Ile Trp Thr Cys Asp Asp Ala Ser Ser Asn Thr Trp Ser
230     235     240
Pro Lys Leu Leu His Lys Phe Asn Asp Val Val Trp His Val Ser
245     250     255
Trp Ser Ile Thr Ala Asn Ile Leu Ala Val Ser Gly Gly Asp Asn
260     265     270
Lys Val Thr Leu Trp Lys Glu Ser Val Asp Gly Gln Trp Val Cys
275     280     285
Ile Ser Asp Val Asn Lys Gly Gln Gly Ser Val Ser Ala Ser Val
290     295     300
Thr Glu Gly Gln Gln Asn Glu Gln
305

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<210> 53
<211> 949
<212> PRT

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<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2759119CD1

<400> 53

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Met Asp Ala Leu Glu Asp Tyr Val Trp Pro Arg Ala Thr Ser Glu
 1          5          10          15
Leu Ile Leu Leu Pro Val Thr Gly Leu Glu Cys Val Gly Asp Arg
 20          25          30
Leu Leu Ala Gly Glu Gly Pro Asp Val Leu Val Tyr Ser Leu Asp
 35          40          45
Phe Gly Gly His Leu Arg Met Ile Lys Arg Val Gln Asn Leu Leu
 50          55          60
Gly His Tyr Leu Ile His Gly Phe Arg Val Arg Pro Glu Pro Asn
 65          70          75
Gly Asp Leu Asp Leu Glu Ala Met Val Ala Val Phe Gly Ser Lys
 80          85          90
Gly Leu Arg Val Val Lys Ile Ser Trp Gly Gln Gly His Phe Trp
 95          100         105
Glu Leu Trp Arg Ser Gly Leu Trp Asn Met Ser Asp Trp Ile Trp
 110         115         120
Asp Ala Arg Trp Leu Glu Gly Asn Ile Ala Leu Ala Leu Gly His
 125         130         135
Asn Ser Val Val Leu Tyr Asp Pro Val Val Gly Cys Ile Leu Gln
 140         145         150
Glu Val Pro Cys Thr Asp Arg Cys Thr Leu Ser Ser Ala Cys Leu
 155         160         165
Ile Gly Asp Ala Trp Lys Glu Leu Thr Ile Val Ala Gly Ala Val
 170         175         180
Ser Asn Gln Leu Leu Val Trp Tyr Pro Ala Thr Ala Leu Ala Asp
 185         190         195
Asn Lys Pro Val Ala Pro Asp Arg Arg Ile Ser Gly His Val Gly
 200         205         210
Ile Ile Phe Ser Met Ser Tyr Leu Glu Ser Lys Gly Leu Leu Ala
 215         220         225
Thr Ala Ser Glu Asp Arg Ser Val Arg Ile Trp Lys Val Gly Asp
 230         235         240
Leu Arg Val Pro Gly Gly Arg Val Gln Asn Ile Gly His Cys Phe
 245         250         255
Gly His Ser Ala Arg Val Trp Gln Val Lys Leu Leu Glu Asn Tyr
 260         265         270
Leu Ile Ser Ala Gly Glu Asp Cys Val Cys Leu Val Trp Ser His
 275         280         285
Glu Gly Glu Ile Leu Gln Ala Phe Arg Gly His Gln Gly Arg Gly
 290         295         300
Ile Arg Ala Ile Ala Ala His Glu Arg Gln Ala Trp Val Ile Thr
 305         310         315
Gly Gly Asp Asp Ser Gly Ile Arg Leu Trp His Leu Val Gly Arg
 320         325         330
Gly Tyr Arg Gly Leu Gly Val Ser Ala Leu Cys Phe Lys Ser Arg
 335         340         345
Ser Arg Pro Gly Thr Leu Lys Ala Val Thr Leu Ala Gly Ser Trp
 350         355         360
Arg Leu Leu Ala Val Thr Asp Thr Gly Ala Leu Tyr Leu Tyr Asp
 365         370         375
Val Glu Val Lys Cys Trp Glu Gln Leu Leu Glu Asp Lys His Phe
 380         385         390
Gln Ser Tyr Cys Leu Leu Glu Ala Ala Pro Gly Pro Glu Gly Phe
 395         400         405
Gly Leu Cys Ala Met Ala Asn Gly Glu Gly Arg Val Lys Val Val
 410         415         420

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Pro	Ile	Asn	Thr	Pro	Thr	Ala	Ala	Val	Asp	Gln	Thr	Leu	Phe	Pro
				425					430					435
Gly	Lys	Val	His	Ser	Leu	Ser	Trp	Ala	Leu	Arg	Gly	Tyr	Glu	Glu
				440					445					450
Leu	Leu	Leu	Leu	Ala	Ser	Gly	Pro	Gly	Gly	Val	Val	Ala	Cys	Leu
				455					460					465
Glu	Ile	Ser	Ala	Ala	Pro	Ser	Gly	Lys	Ala	Ile	Phe	Val	Lys	Glu
				470					475					480
Arg	Cys	Arg	Tyr	Leu	Leu	Pro	Pro	Ser	Lys	Gln	Arg	Trp	His	Thr
				485					490					495
Cys	Ser	Ala	Phe	Leu	Pro	Pro	Gly	Asp	Phe	Leu	Val	Cys	Gly	Asp
				500					505					510
Arg	Arg	Gly	Ser	Val	Leu	Leu	Phe	Pro	Ser	Arg	Pro	Gly	Leu	Leu
				515					520					525
Lys	Asp	Pro	Gly	Val	Gly	Gly	Lys	Ala	Arg	Ala	Gly	Ala	Gly	Ala
				530					535					540
Pro	Val	Val	Gly	Ser	Gly	Ser	Ser	Gly	Gly	Gly	Asn	Ala	Phe	Thr
				545					550					555
Gly	Leu	Gly	Pro	Val	Ser	Thr	Leu	Pro	Ser	Leu	His	Gly	Lys	Gln
				560					565					570
Gly	Val	Thr	Ser	Val	Thr	Cys	His	Gly	Gly	Tyr	Val	Tyr	Thr	Ile
				575					580					585
Gly	Arg	Asp	Gly	Ala	Tyr	Tyr	Gln	Leu	Phe	Val	Arg	Asp	Gly	Gln
				590					595					600
Leu	Gln	Pro	Val	Leu	Arg	Gln	Lys	Ser	Cys	Arg	Gly	Met	Asn	Trp
				605					610					615
Leu	Ala	Gly	Leu	Arg	Ile	Val	Pro	Asp	Gly	Ser	Met	Val	Ile	Leu
				620					625					630
Gly	Phe	His	Ala	Asn	Glu	Phe	Val	Val	Trp	Asn	Pro	Arg	Ser	His
				635					640					645
Glu	Lys	Leu	His	Ile	Val	Asn	Cys	Gly	Gly	Gly	His	Arg	Ser	Trp
				650					655					660
Ala	Phe	Ser	Asp	Thr	Glu	Ala	Ala	Met	Ala	Phe	Ala	Tyr	Leu	Lys
				665					670					675
Asp	Gly	Asp	Val	Met	Leu	Tyr	Arg	Ala	Leu	Gly	Gly	Cys	Thr	Arg
				680					685					690
Pro	His	Val	Ile	Leu	Arg	Glu	Gly	Leu	His	Gly	Arg	Glu	Ile	Thr
				695					700					705
Cys	Val	Lys	Arg	Val	Gly	Thr	Ile	Thr	Leu	Gly	Pro	Glu	Tyr	Gly
				710					715					720
Val	Pro	Ser	Phe	Met	Gln	Pro	Asp	Asp	Leu	Glu	Pro	Gly	Ser	Glu
				725					730					735
Gly	Pro	Asp	Leu	Thr	Asp	Ile	Val	Ile	Thr	Cys	Ser	Glu	Asp	Thr
				740					745					750
Thr	Val	Cys	Val	Leu	Ala	Leu	Pro	Thr	Thr	Thr	Gly	Ser	Ala	His
				755					760					765
Ala	Leu	Thr	Ala	Val	Cys	Asn	His	Ile	Ser	Ser	Val	Arg	Ala	Val
				770					775					780
Ala	Val	Trp	Gly	Ile	Gly	Thr	Pro	Gly	Gly	Pro	Gln	Asp	Pro	Gln
				785					790					795
Pro	Gly	Leu	Thr	Ala	His	Val	Val	Ser	Ala	Gly	Gly	Arg	Ala	Glu
				800					805					810
Met	His	Cys	Phe	Ser	Ile	Met	Val	Thr	Pro	Asp	Pro	Ser	Thr	Pro
				815					820					825
Ser	Arg	Leu	Ala	Cys	His	Val	Met	His	Leu	Ser	Ser	His	Arg	Leu
				830					835					840
Asp	Glu	Tyr	Trp	Asp	Arg	Gln	Arg	Asn	Arg	His	Arg	Met	Val	Lys
				845					850					855
Val	Asp	Pro	Glu	Thr	Arg	Tyr	Met	Ser	Leu	Ala	Val	Cys	Glu	Leu
				860					865					870
Asp	Gln	Pro	Gly	Leu	Gly	Pro	Leu	Val	Ala	Ala	Ala	Cys	Ser	Asp
				875					880					885
Gly	Ala	Val	Ser	Ser	Phe	Phe	Cys	Arg	Ile	Leu	Gly	Gly	Phe	Cys

	890		895		900
Ser Ser Leu Leu Lys Pro Ser Thr Ile		Ser Asp Val Ser Ser Arg			
	905		910		915
Ser Thr Pro Leu His Thr Arg His Pro		Thr Arg Gly Gly Gly Ser			
	920		925		930
Ser Cys Ala Ala Gln Leu Leu Met Ala		Ala Trp Leu Ser Gly Ile			
	935		940		945

Ser Pro Pro Cys

<210> 54

<211> 227

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2823818CD1

<400> 54

Met Arg His Glu Ala	Pro Met Gln Met	Ala Ser Ala Gln Asp Ala	
1	5	10	15
Arg Tyr Gly Gln Lys	Asp Ser Ser Asp	Gln Asn Phe Asp Tyr Met	
	20	25	30
Phe Lys Leu Leu Ile	Ile Gly Asn Ser	Ser Val Gly Lys Thr Ser	
	35	40	45
Phe Leu Phe Arg Tyr	Ala Asp Asp Ser	Phe Thr Ser Ala Phe Val	
	50	55	60
Ser Thr Val Gly Ile	Asp Phe Lys Val	Lys Thr Val Phe Lys Asn	
	65	70	75
Val Lys Arg Ile Lys	Leu Gln Ile Trp	Asp Thr Ala Gly Gln Glu	
	80	85	90
Arg Tyr Arg Thr Ile	Thr Thr Ala Tyr	Tyr Arg Gly Ala Met Gly	
	95	100	105
Phe Ile Leu Met Tyr	Asp Ile Thr Asn	Glu Glu Ser Phe Asn Ala	
	110	115	120
Val Gln Asp Trp Ser	Thr Gln Ile Lys	Thr Tyr Ser Trp Asp Asn	
	125	130	135
Ala Gln Val Ile Leu	Val Gly Asn Lys	Cys Asp Met Glu Asp Glu	
	140	145	150
Arg Val Ile Ser Thr	Glu Arg Gly Gln	His Leu Gly Glu Gln Leu	
	155	160	165
Gly Phe Glu Phe Phe	Glu Thr Ser Ala	Lys Asp Asn Ile Asn Val	
	170	175	180
Lys Gln Thr Phe Glu	Arg Leu Val Asp	Ile Ile Cys Asp Lys Met	
	185	190	195
Ser Glu Ser Leu Glu	Thr Asp Pro Ala	Ile Thr Ala Ala Lys Gln	
	200	205	210
Asn Thr Arg Leu Lys	Glu Thr Pro Pro	Pro Pro Gln Pro Asn Cys	
	215	220	225

Ala Cys

<210> 55

<211> 474

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2859730CD1

<400> 55

Met Arg Arg Val Val	Arg Gln Ser Lys	Phe Arg His Val Phe Gly	
1	5	10	15

Gln	Ala	Val	Lys	Asn	Asp	Gln	Cys	Tyr	Asp	Asp	Ile	Arg	Val	Ser	
				20					25					30	
Arg	Val	Thr	Trp	Asp	Ser	Ser	Phe	Cys	Ala	Val	Asn	Pro	Arg	Phe	
				35					40					45	
Val	Ala	Ile	Ile	Ile	Glu	Ala	Ser	Gly	Gly	Gly	Ala	Phe	Leu	Val	
				50					55					60	
Leu	Pro	Leu	Arg	Lys	Thr	Gly	Arg	Ile	Asp	Lys	Ser	Tyr	Pro	Thr	
				65					70					75	
Val	Cys	Gly	His	Thr	Gly	Pro	Val	Leu	Asp	Ile	Asp	Trp	Cys	Pro	
				80					85					90	
His	Asn	Asp	Gln	Val	Ile	Ala	Ser	Gly	Ser	Glu	Asp	Cys	Thr	Val	
				95					100					105	
Met	Val	Trp	Gln	Ile	Pro	Glu	Asn	Gly	Leu	Thr	Leu	Ser	Leu	Thr	
				110					115					120	
Glu	Pro	Val	Val	Ile	Leu	Glu	Gly	His	Ser	Lys	Arg	Val	Gly	Ile	
				125					130					135	
Val	Ala	Trp	His	Pro	Thr	Ala	Arg	Asn	Val	Leu	Leu	Ser	Ala	Gly	
				140					145					150	
Cys	Asp	Asn	Ala	Ile	Ile	Ile	Trp	Asn	Val	Gly	Thr	Gly	Glu	Ala	
				155					160					165	
Leu	Ile	Asn	Leu	Asp	Asp	Met	His	Ser	Asp	Met	Ile	Tyr	Asn	Val	
				170					175					180	
Ser	Trp	Asn	Arg	Asn	Gly	Ser	Leu	Ile	Cys	Thr	Ala	Ser	Lys	Asp	
				185					190					195	
Lys	Lys	Val	Arg	Val	Ile	Asp	Pro	Arg	Lys	Gln	Glu	Ile	Val	Ala	
				200					205					210	
Glu	Lys	Glu	Lys	Ala	His	Glu	Gly	Ala	Arg	Pro	Met	Arg	Ala	Ile	
				215					220					225	
Phe	Leu	Ala	Asp	Gly	Asn	Val	Phe	Thr	Thr	Gly	Phe	Ser	Arg	Met	
				230					235					240	
Ser	Glu	Arg	Gln	Leu	Ala	Leu	Trp	Asn	Pro	Lys	Asn	Met	Gln	Glu	
				245					250					255	
Pro	Ile	Ala	Leu	His	Glu	Met	Asp	Thr	Ser	Asn	Gly	Val	Leu	Leu	
				260					265					270	
Pro	Phe	Tyr	Asp	Pro	Asp	Thr	Ser	Ile	Ile	Tyr	Leu	Cys	Gly	Lys	
				275					280					285	
Gly	Asp	Ser	Ser	Ile	Arg	Tyr	Phe	Glu	Ile	Thr	Asp	Glu	Ser	Pro	
				290					295					300	
Tyr	Val	His	Tyr	Leu	Asn	Thr	Phe	Ser	Ser	Lys	Glu	Pro	Gln	Arg	
				305					310					315	
Gly	Met	Gly	Tyr	Met	Pro	Lys	Arg	Gly	Leu	Asp	Val	Asn	Lys	Cys	
				320					325					330	
Glu	Ile	Ala	Arg	Phe	Phe	Lys	Leu	His	Glu	Arg	Lys	Cys	Glu	Pro	
				335					340					345	
Ile	Ile	Met	Thr	Val	Pro	Arg	Lys	Ser	Asp	Leu	Phe	Gln	Asp	Asp	
				350					355					360	
Leu	Tyr	Pro	Asp	Thr	Ala	Gly	Pro	Glu	Ala	Ala	Leu	Glu	Ala	Glu	
				365					370					375	
Glu	Trp	Phe	Glu	Gly	Lys	Asn	Ala	Asp	Pro	Ile	Leu	Ile	Ser	Leu	
				380					385					390	
Lys	His	Gly	Tyr	Ile	Pro	Gly	Lys	Asn	Arg	Asp	Leu	Lys	Val	Val	
				395					400					405	
Lys	Lys	Asn	Ile	Leu	Asp	Ser	Lys	Pro	Thr	Ala	Asn	Lys	Lys	Cys	
				410					415					420	
Asp	Leu	Ile	Ser	Ile	Pro	Lys	Lys	Thr	Thr	Asp	Thr	Ala	Ser	Val	
				425					430					435	
Gln	Asn	Glu	Ala	Lys	Leu	Asp	Glu	Ile	Leu	Lys	Glu	Ile	Lys	Ser	
				440					445					450	
Ile	Lys	Asp	Thr	Ile	Cys	Asn	Gln	Asp	Glu	Arg	Ile	Ser	Lys	Leu	
				455					460					465	
Glu	Gln	Gln	Met	Ala	Lys	Ile	Ala	Ala							
				470											

<210> 56

<211> 547
 <212> PRT
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Incyte ID No: 2861155CD1

<400> 56
 Met Lys Thr Leu Glu Thr Gln Pro Leu Ala Pro Asp Cys Cys Pro
 1 5 10 15
 Ser Asp Gln Asp Pro Ala Pro Ala His Pro Ser Pro His Ala Ser
 20 25 30
 Pro Met Asn Lys Asn Ala Asp Ser Glu Leu Met Pro Pro Pro Pro
 35 40 45
 Glu Arg Gly Asp Pro Pro Arg Leu Ser Pro Asp Pro Val Ala Gly
 50 55 60
 Ser Ala Val Ser Gln Glu Leu Arg Glu Gly Asp Pro Val Ser Leu
 65 70 75
 Ser Thr Pro Leu Glu Thr Glu Phe Gly Ser Pro Ser Glu Leu Ser
 80 85 90
 Pro Arg Ile Glu Glu Gln Glu Leu Ser Glu Asn Thr Ser Leu Pro
 95 100 105
 Ala Glu Glu Ala Asn Gly Ser Leu Ser Glu Glu Glu Ala Asn Gly
 110 115 120
 Pro Glu Leu Gly Ser Gly Lys Ala Met Glu Asp Thr Ser Gly Glu
 125 130 135
 Pro Ala Ala Glu Asp Glu Gly Asp Thr Ala Trp Asn Tyr Ser Phe
 140 145 150
 Ser Gln Leu Pro Arg Phe Leu Ser Gly Ser Trp Ser Glu Phe Ser
 155 160 165
 Thr Gln Pro Glu Asn Phe Leu Lys Gly Cys Lys Trp Ala Pro Asp
 170 175 180
 Gly Ser Cys Ile Leu Thr Asn Ser Ala Asp Asn Ile Leu Arg Ile
 185 190 195
 Tyr Asn Leu Pro Pro Glu Leu Tyr His Glu Gly Glu Gln Val Glu
 200 205 210
 Tyr Ala Glu Met Val Pro Val Leu Arg Met Val Glu Gly Asp Thr
 215 220 225
 Ile Tyr Asp Tyr Cys Trp Tyr Ser Leu Met Ser Ser Ala Gln Pro
 230 235 240
 Asp Thr Ser Tyr Val Ala Ser Ser Ser Arg Glu Asn Pro Ile His
 245 250 255
 Ile Trp Asp Ala Phe Thr Gly Glu Leu Arg Ala Ser Phe Arg Ala
 260 265 270
 Tyr Asn His Leu Asp Glu Leu Thr Ala Ala His Ser Leu Cys Phe
 275 280 285
 Ser Pro Asp Gly Ser Gln Leu Phe Cys Gly Phe Asn Arg Thr Val
 290 295 300
 Arg Val Phe Ser Thr Ala Arg Pro Gly Arg Asp Cys Glu Val Arg
 305 310 315
 Ala Thr Phe Ala Lys Lys Gln Gly Gln Ser Gly Ile Ile Ser Cys
 320 325 330
 Ile Ala Phe Ser Pro Ala Gln Pro Leu Tyr Ala Cys Gly Ser Tyr
 335 340 345
 Gly Arg Ser Leu Gly Leu Tyr Ala Trp Asp Asp Gly Ser Pro Leu
 350 355 360
 Ala Leu Leu Gly Gly His Gln Gly Gly Ile Thr His Leu Cys Phe
 365 370 375
 His Pro Asp Gly Asn Arg Phe Phe Ser Gly Ala Arg Lys Asp Ala
 380 385 390
 Glu Leu Leu Cys Trp Asp Leu Arg Gln Ser Gly Tyr Pro Leu Trp
 395 400 405

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Ser Leu Gly Arg Glu Val Thr Thr Asn Gln Arg Ile Tyr Phe Asp
410 415 420
Leu Asp Pro Thr Gly Gln Phe Leu Val Ser Gly Ser Thr Ser Gly
425 430 435
Ala Val Ser Val Trp Asp Thr Asp Gly Pro Gly Asn Asp Gly Lys
440 445 450
Pro Glu Pro Val Leu Ser Phe Leu Pro Gln Lys Asp Cys Thr Asn
455 460 465
Gly Val Ser Leu His Pro Ser Leu Pro Leu Leu Ala Thr Ala Ser
470 475 480
Gly Gln Arg Val Phe Pro Glu Pro Thr Glu Ser Gly Asp Glu Gly
485 490 495
Glu Glu Leu Gly Leu Pro Leu Leu Ser Thr Arg His Val His Leu
500 505 510
Glu Cys Arg Leu Gln Leu Trp Trp Cys Gly Gly Gly Pro Asp Ser
515 520 525
Ser Ile Pro Asp Asp His Gln Gly Glu Lys Gly Gln Gly Gly Thr
530 535 540
Gly Gly Arg Ser Trp Gly Ala
545

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<210> 57

<211> 686

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3002667CD1

<400> 57

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Met Gly Glu Phe Lys Val His Arg Val Arg Phe Phe Asn Tyr Val
1 5 10 15
Pro Ser Gly Ile Arg Cys Val Ala Tyr Asn Asn Gln Ser Asn Arg
20 25 30
Leu Ala Val Ser Arg Thr Asp Gly Thr Val Glu Ile Tyr Asn Leu
35 40 45
Ser Ala Asn Tyr Phe Gln Glu Lys Phe Phe Pro Gly His Glu Ser
50 55 60
Arg Ala Thr Glu Ala Leu Cys Trp Ala Glu Gly Gln Arg Leu Phe
65 70 75
Ser Ala Gly Leu Asn Gly Glu Ile Met Glu Tyr Asp Leu Gln Ala
80 85 90
Leu Asn Ile Lys Tyr Ala Met Asp Ala Phe Gly Gly Pro Ile Trp
95 100 105
Ser Met Ala Ala Ser Pro Ser Gly Ser Gln Leu Leu Val Gly Cys
110 115 120
Glu Asp Gly Ser Val Lys Leu Phe Gln Ile Thr Pro Asp Lys Ile
125 130 135
Gln Phe Glu Arg Asn Phe Asp Arg Gln Lys Ser Arg Ile Leu Ser
140 145 150
Leu Ser Trp His Pro Ser Gly Thr His Ile Ala Ala Gly Ser Ile
155 160 165
Asp Tyr Ile Ser Val Phe Asp Val Lys Ser Gly Ser Ala Val His
170 175 180
Lys Met Ile Val Asp Arg Gln Tyr Met Gly Val Ser Lys Arg Lys
185 190 195
Cys Ile Val Trp Gly Val Ala Phe Leu Ser Asp Gly Thr Ile Ile
200 205 210
Ser Val Asp Ser Ala Gly Lys Val Gln Phe Trp Asp Ser Ala Thr
215 220 225
Gly Thr Leu Val Lys Ser His Leu Ile Ala Asn Ala Asp Val Gln
230 235 240
Ser Ile Ala Val Ala Asp Gln Glu Asp Ser Phe Val Val Gly Thr

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Ala Glu Gly Thr Val Phe His Phe Gln Leu Val Pro Val Thr Ser	245	250	255
Asn Ser Ser Glu Lys Gln Trp Val Arg Thr Lys Pro Phe Gln His	260	265	270
His Thr His Asp Val Arg Thr Val Ala His Ser Pro Thr Ala Leu	275	280	285
Ile Ser Gly Gly Thr Asp Thr His Leu Val Phe Arg Pro Leu Met	290	295	300
Glu Lys Val Glu Val Lys Asn Tyr Asp Ala Ala Leu Arg Lys Ile	305	310	315
Thr Phe Pro His Arg Cys Leu Ile Ser Cys Ser Lys Lys Arg Gln	320	325	330
Leu Leu Leu Phe Gln Phe Ala His His Leu Glu Leu Trp Arg Leu	335	340	345
Gly Ser Thr Val Ala Thr Gly Lys Asn Gly Asp Thr Leu Pro Leu	350	355	360
Ser Lys Asn Ala Asp His Leu Leu His Leu Lys Thr Lys Gly Pro	365	370	375
Glu Asn Ile Ile Cys Ser Cys Ile Ser Pro Cys Gly Ser Trp Ile	380	385	390
Ala Tyr Ser Thr Val Ser Arg Phe Phe Leu Tyr Arg Leu Asn Tyr	395	400	405
Glu His Asp Asn Ile Ser Leu Lys Arg Val Ser Lys Met Pro Ala	410	415	420
Phe Leu Arg Ser Ala Leu Gln Ile Leu Phe Ser Glu Asp Ser Thr	425	430	435
Lys Leu Phe Val Ala Ser Asn Gln Gly Ala Leu His Ile Val Gln	440	445	450
Leu Ser Gly Gly Ser Phe Lys His Leu His Ala Phe Gln Pro Gln	455	460	465
Ser Gly Thr Val Glu Ala Met Cys Leu Leu Ala Val Ser Pro Asp	470	475	480
Gly Asn Trp Leu Ala Ala Ser Gly Thr Ser Ala Gly Val His Val	485	490	495
Tyr Asn Val Lys Gln Leu Lys Leu His Cys Thr Val Pro Ala Tyr	500	505	510
Asn Phe Pro Val Thr Ala Met Ala Ile Ala Pro Asn Thr Asn Asn	515	520	525
Leu Val Ile Ala His Ser Asp Gln Gln Val Phe Glu Tyr Ser Ile	530	535	540
Pro Asp Lys Gln Thr Asp Trp Ser Arg Thr Val Gln Lys Gln	545	550	555
Gly Phe His His Leu Trp Leu Gln Arg Asp Thr Pro Ile Thr His	560	565	570
Ile Ser Phe His Pro Lys Arg Pro Met His Ile Leu Leu His Asp	575	580	585
Ala Tyr Met Phe Cys Ile Ile Asp Lys Ser Leu Pro Leu Pro Asn	590	595	600
Asp Lys Thr Leu Leu Tyr Asn Pro Phe Pro Pro Thr Asn Glu Ser	605	610	615
Asp Val Ile Arg Arg Arg Thr Ala His Ala Phe Lys Ile Ser Lys	620	625	630
Ile Tyr Lys Pro Leu Leu Phe Met Asp Leu Leu Asp Glu Arg Thr	635	640	645
Leu Val Ala Val Glu Arg Pro Leu Asp Asp Ile Ile Ala Gln Leu	650	655	660
Pro Pro Pro Ile Lys Lys Lys Lys Phe Gly Thr	665	670	675
	680	685	

<210> 58

<211> 93

<212> PRT

<213> Homo sapiens

<220>
 <221> misc_feature
 <223> Incyte ID No: 3043734CD1

<400> 58
 Met Thr Ser Lys Arg Lys Pro Cys Gln Thr Gln Leu Arg Arg Ser
 1 5 10 15
 Ile Ser Glu Gln Leu Arg Asp Ser Thr Ala Arg Ala Trp Asp Leu
 20 25 30
 Leu Trp Lys Asn Val Arg Glu Arg Arg Leu Ala Glu Ile Glu Ala
 35 40 45
 Lys Glu Ala Cys Asp Trp Leu Arg Ala Ala Gly Phe Pro Gln Tyr
 50 55 60
 Ala Gln Leu Tyr Glu Asp Ser Gln Phe Pro Ile Asn Ile Val Ala
 65 70 75
 Val Lys Asn Asp His Asp Phe Leu Glu Lys Asp Leu Val Glu Pro
 80 85 90
 Leu Cys Arg

<210> 59
 <211> 521
 <212> PRT
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Incyte ID No: 3294893CD1

<400> 59
 Met Arg Arg Gly His Gly Gln Arg Arg Gly Gln Glu Ala Ile Leu
 1 5 10 15
 Glu Ala His Asn Ser Lys Leu Pro Gly Ser Ile Gln His Val Tyr
 20 25 30
 Gly Ala Gln His Pro Pro Phe Asp Pro Leu Leu His Gly Thr Leu
 35 40 45
 Leu Arg Ser Thr Ala Lys Met Pro Thr Thr Pro Val Lys Ala Lys
 50 55 60
 Arg Val Ser Thr Phe Gln Glu Phe Glu Ser Asn Thr Ser Asp Ala
 65 70 75
 Trp Asp Ala Gly Glu Asp Asp Asp Glu Leu Leu Ala Met Ala Ala
 80 85 90
 Glu Ser Leu Asn Ser Glu Val Val Met Glu Thr Ala Asn Arg Val
 95 100 105
 Leu Arg Asn His Ser Gln Arg Gln Gly Arg Pro Thr Leu Gln Glu
 110 115 120
 Gly Pro Gly Leu Gln Gln Lys Pro Arg Pro Glu Ala Glu Pro Pro
 125 130 135
 Ser Pro Pro Ser Gly Asp Leu Arg Leu Val Lys Ser Val Ser Glu
 140 145 150
 Ser His Thr Ser Cys Pro Ala Glu Ser Ala Ser Asp Ala Ala Pro
 155 160 165
 Leu Gln Arg Ser Gln Ser Leu Pro His Ser Ala Thr Val Thr Leu
 170 175 180
 Gly Gly Thr Ser Asp Pro Ser Thr Leu Ser Ser Ser Ala Leu Ser
 185 190 195
 Glu Arg Glu Ala Ser Arg Leu Asp Lys Phe Lys Gln Leu Leu Ala
 200 205 210
 Gly Pro Asn Thr Asp Leu Glu Glu Leu Arg Arg Leu Ser Trp Ser
 215 220 225
 Gly Ile Pro Lys Pro Val Arg Pro Met Thr Trp Lys Leu Leu Ser
 230 235 240
 Gly Tyr Leu Pro Ala Asn Val Asp Arg Arg Pro Ala Thr Leu Gln
 245 250 255

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Arg Lys Gln Lys Glu Tyr Phe Ala Phe Ile Glu His Tyr Tyr Asp
260 265 270
Ser Arg Asn Asp Glu Val His Gln Asp Thr Tyr Arg Gln Ile His
275 280 285
Ile Asp Ile Pro Arg Met Ser Pro Glu Ala Leu Ile Leu Gln Pro
290 295 300
Lys Val Thr Glu Ile Phe Glu Arg Ile Leu Phe Ile Trp Ala Ile
305 310 315
Arg His Pro Ala Ser Gly Tyr Val Gln Gly Ile Asn Asp Leu Val
320 325 330
Thr Pro Phe Phe Val Val Phe Ile Cys Glu Tyr Ile Glu Ala Glu
335 340 345
Glu Val Asp Thr Val Asp Val Ser Gly Val Pro Ala Glu Val Leu
350 355 360
Cys Asn Ile Glu Ala Asp Thr Tyr Trp Cys Met Ser Lys Leu Leu
365 370 375
Asp Gly Ile Gln Asp Asn Tyr Thr Phe Ala Gln Pro Gly Ile Gln
380 385 390
Met Lys Val Lys Met Leu Glu Glu Leu Val Ser Arg Ile Asp Glu
395 400 405
Gln Val His Arg His Leu Asp Gln His Glu Val Arg Tyr Leu Gln
410 415 420
Phe Ala Phe Arg Trp Met Asn Asn Leu Leu Met Arg Glu Val Pro
425 430 435
Leu Arg Cys Thr Ile Arg Leu Trp Asp Thr Tyr Gln Ser Glu Pro
440 445 450
Asp Gly Phe Ser His Phe His Leu Tyr Val Cys Ala Ala Phe Leu
455 460 465
Val Arg Trp Arg Lys Glu Ile Leu Glu Glu Lys Asp Phe Gln Glu
470 475 480
Leu Leu Leu Phe Leu Gln Asn Leu Pro Thr Ala His Trp Asp Asp
485 490 495
Glu Asp Ile Ser Leu Leu Leu Ala Glu Ala Tyr Arg Leu Lys Phe
500 505 510
Ala Phe Ala Asp Ala Pro Asn His Tyr Lys Lys
515 520

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<210> 60

<211> 751

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3349052CD1

<400> 60

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Met Arg Leu Leu Gly Ala Ala Ala Val Ala Ala Leu Gly Arg Gly
1 5 10 15
Arg Ala Pro Ala Ser Leu Gly Trp Gln Arg Lys Gln Val Asn Trp
20 25 30
Lys Ala Cys Arg Trp Ser Ser Ser Gly Val Ile Pro Asn Glu Lys
35 40 45
Ile Arg Asn Ile Gly Ile Ser Ala His Ile Asp Ser Gly Lys Thr
50 55 60
Thr Leu Thr Glu Arg Val Leu Tyr Tyr Thr Gly Arg Ile Ala Lys
65 70 75
Met His Glu Val Lys Gly Lys Asp Gly Val Gly Ala Val Met Asp
80 85 90
Ser Met Glu Leu Glu Arg Gln Arg Gly Ile Thr Ile Gln Ser Ala
95 100 105
Ala Thr Tyr Thr Met Trp Lys Asp Val Asn Ile Asn Ile Ile Asp
110 115 120
Thr Pro Gly His Val Asp Phe Thr Ile Glu Val Glu Arg Ala Leu

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	125		130		135
Arg Val Leu Asp Gly	Ala Val Leu Val Leu	Cys Ala Val Gly	Gly		
	140		145		150
Val Gln Cys Gln Thr	Met Thr Val Asn Arg	Gln Met Lys Arg	Tyr		
	155		160		165
Asn Val Pro Phe Leu	Thr Phe Ile Asn Lys	Leu Asp Arg Met	Gly		
	170		175		180
Ser Asn Pro Ala Arg	Ala Leu Gln Gln Met	Arg Ser Lys Leu	Asn		
	185		190		195
His Asn Ala Ala Phe	Met Gln Ile Pro Met	Gly Leu Glu Gly	Asn		
	200		205		210
Phe Lys Gly Ile Ile	Asp Leu Ile Glu Glu	Arg Ala Ile Tyr	Phe		
	215		220		225
Asp Gly Asp Phe Gly	Gln Ile Val Arg Tyr	Gly Glu Ile Pro	Ala		
	230		235		240
Glu Leu Arg Ala Ala	Ala Thr Asp His Arg	Gln Glu Leu Ile	Glu		
	245		250		255
Cys Val Ala Asn Ser	Asp Glu Gln Leu Gly	Glu Met Phe Leu	Glu		
	260		265		270
Glu Lys Ile Pro Ser	Ile Ser Asp Leu Lys	Leu Ala Ile Arg	Arg		
	275		280		285
Ala Thr Leu Lys Arg	Ser Phe Thr Pro Val	Phe Leu Gly Ser	Ala		
	290		295		300
Leu Lys Asn Lys Gly	Val Gln Pro Leu Leu	Asp Ala Val Leu	Glu		
	305		310		315
Tyr Leu Pro Asn Pro	Ser Glu Val Gln Asn	Tyr Ala Ile Leu	Asn		
	320		325		330
Lys Glu Asp Asp Ser	Lys Glu Lys Thr Lys	Ile Leu Met Asn	Ser		
	335		340		345
Ser Arg Asp Asn Ser	His Pro Phe Val Gly	Leu Ala Phe Lys	Leu		
	350		355		360
Glu Val Gly Arg Phe	Gly Gln Leu Thr Tyr	Val Arg Ser Tyr	Gln		
	365		370		375
Gly Glu Leu Lys Lys	Gly Asp Thr Ile Tyr	Asn Thr Arg Thr	Arg		
	380		385		390
Lys Lys Val Arg Leu	Gln Arg Leu Ala Arg	Met His Ala Asp	Met		
	395		400		405
Met Glu Asp Val Glu	Glu Val Tyr Ala Gly	Asp Ile Cys Ala	Leu		
	410		415		420
Phe Gly Ile Asp Cys	Ala Ser Gly Asp Thr	Phe Thr Asp Lys	Ala		
	425		430		435
Asn Ser Gly Leu Ser	Met Glu Ser Ile His	Val Pro Asp Pro	Val		
	440		445		450
Ile Ser Ile Ala Met	Lys Pro Ser Asn Lys	Asn Asp Leu Glu	Lys		
	455		460		465
Phe Ser Lys Gly Ile	Gly Arg Phe Thr Arg	Glu Asp Pro Thr	Phe		
	470		475		480
Lys Val Tyr Phe Asp	Thr Glu Asn Lys Glu	Thr Val Ile Ser	Gly		
	485		490		495
Met Gly Glu Leu His	Leu Glu Ile Tyr Ala	Gln Arg Leu Glu	Arg		
	500		505		510
Glu Tyr Gly Cys Pro	Cys Ile Thr Gly Lys	Pro Lys Val Ala	Phe		
	515		520		525
Arg Glu Thr Ile Thr	Ala Pro Val Pro Phe	Asp Phe Thr His	Lys		
	530		535		540
Lys Gln Ser Gly Gly	Ala Gly Gln Tyr Gly	Lys Val Ile Gly	Val		
	545		550		555
Leu Glu Pro Leu Asp	Pro Glu Asp Tyr Thr	Lys Leu Glu Phe	Ser		
	560		565		570
Asp Glu Thr Phe Gly	Ser Asn Ile Pro Lys	Gln Phe Val Pro	Ala		
	575		580		585
Val Glu Lys Gly Phe	Leu Asp Ala Cys Glu	Lys Gly Pro Leu	Ser		
	590		595		600

Gly	His	Lys	Leu	Ser	Gly	Leu	Arg	Phe	Val	Leu	Gln	Asp	Gly	Ala	
				605					610					615	
His	His	Met	Val	Asp	Ser	Asn	Glu	Ile	Ser	Phe	Ile	Arg	Ala	Gly	
				620					625					630	
Glu	Gly	Ala	Leu	Lys	Gln	Ala	Leu	Ala	Asn	Ala	Thr	Leu	Cys	Ile	
				635					640					645	
Leu	Glu	Pro	Ile	Met	Ala	Val	Glu	Val	Val	Ala	Pro	Asn	Glu	Phe	
				650					655					660	
Gln	Gly	Gln	Val	Ile	Ala	Gly	Ile	Asn	Arg	Arg	His	Gly	Val	Ile	
				665					670					675	
Thr	Gly	Gln	Asp	Gly	Val	Glu	Asp	Tyr	Phe	Thr	Leu	Tyr	Ala	Asp	
				680					685					690	
Val	Pro	Leu	Asn	Asp	Met	Phe	Gly	Tyr	Ser	Thr	Glu	Leu	Arg	Ser	
				695					700					705	
Cys	Thr	Glu	Gly	Lys	Gly	Glu	Tyr	Thr	Met	Glu	Tyr	Ser	Arg	Tyr	
				710					715					720	
Gln	Pro	Cys	Leu	Pro	Ser	Thr	Gln	Glu	Asp	Val	Ile	Asn	Lys	Tyr	
				725					730					735	
Leu	Glu	Ala	Thr	Gly	Gln	Leu	Pro	Val	Lys	Lys	Gly	Lys	Ala	Lys	
				740					745					750	

Asn

<210> 61

<211> 666

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3357264CD1

<220>

<221> unsure

<222> 281

<223> unknown or other

<400> 61

Met	Cys	Gly	Ala	Val	Ile	Pro	Leu	His	Lys	Pro	Ala	Gly	Arg	Lys	
1				5					10					15	
Leu	Gln	Asn	Gln	Arg	Ala	Ala	Leu	Asn	Gln	Gln	Ile	Leu	Lys	Ala	
				20					25					30	
Val	Arg	Met	Arg	Thr	Gly	Ala	Glu	Asn	Leu	Leu	Lys	Val	Ala	Thr	
				35					40					45	
Asn	Ser	Lys	Val	Arg	Glu	Gln	Val	Arg	Leu	Glu	Leu	Ser	Phe	Val	
				50					55					60	
Asn	Ser	Asp	Leu	Gln	Met	Leu	Lys	Glu	Glu	Leu	Glu	Gly	Leu	Asn	
				65					70					75	
Ile	Ser	Val	Gly	Val	Tyr	Gln	Asn	Thr	Glu	Glu	Ala	Phe	Thr	Ile	
				80					85					90	
Pro	Leu	Ile	Pro	Leu	Gly	Leu	Lys	Glu	Thr	Lys	Asp	Val	Asp	Phe	
				95					100					105	
Ala	Val	Val	Leu	Lys	Asp	Phe	Ile	Leu	Glu	His	Tyr	Ser	Glu	Asp	
				110					115					120	
Gly	Tyr	Leu	Tyr	Glu	Asp	Glu	Ile	Ala	Asp	Leu	Met	Asp	Leu	Arg	
				125					130					135	
Gln	Ala	Cys	Arg	Thr	Pro	Ser	Arg	Asp	Glu	Ala	Gly	Val	Glu	Leu	
				140					145					150	
Leu	Met	Thr	Tyr	Phe	Ile	Gln	Leu	Gly	Phe	Val	Glu	Ser	Arg	Phe	
				155					160					165	
Phe	Pro	Pro	Thr	Arg	Gln	Met	Gly	Leu	Leu	Phe	Thr	Trp	Tyr	Asp	
				170					175					180	
Ser	Leu	Thr	Gly	Val	Pro	Val	Ser	Gln	Gln	Asn	Leu	Leu	Leu	Glu	
				185					190					195	

Lys	Ala	Ser	Val	Leu	Phe	Asn	Thr	Gly	Ala	Leu	Tyr	Thr	Gln	Ile
				200					205					210
Gly	Thr	Arg	Cys	Asp	Arg	Gln	Thr	Gln	Ala	Gly	Leu	Glu	Ser	Ala
				215					220					225
Ile	Asp	Ala	Phe	Gln	Arg	Ala	Ala	Gly	Val	Leu	Asn	Tyr	Leu	Lys
				230					235					240
Asp	Thr	Phe	Thr	His	Thr	Pro	Ser	Tyr	Asp	Met	Ser	Pro	Ala	Met
				245					250					255
Leu	Ser	Val	Leu	Val	Lys	Met	Met	Leu	Ala	Gln	Ala	Gln	Glu	Ser
				260					265					270
Val	Phe	Glu	Lys	Ile	Ser	Leu	Pro	Gly	Ile	Xaa	Asn	Glu	Phe	Phe
				275					280					285
Met	Leu	Val	Lys	Val	Ala	Gln	Glu	Ala	Ala	Lys	Val	Gly	Glu	Val
				290					295					300
Tyr	Gln	Gln	Leu	His	Ala	Ala	Met	Ser	Gln	Ala	Pro	Val	Lys	Glu
				305					310					315
Asn	Ile	Pro	Tyr	Ser	Trp	Ala	Ser	Leu	Ala	Cys	Val	Lys	Ala	His
				320					325					330
His	Tyr	Ala	Ala	Leu	Ala	His	Tyr	Phe	Thr	Ala	Ile	Leu	Leu	Ile
				335					340					345
Asp	His	Gln	Val	Lys	Pro	Gly	Thr	Asp	Leu	Asp	His	Gln	Glu	Lys
				350					355					360
Cys	Leu	Ser	Gln	Leu	Tyr	Asp	His	Met	Pro	Glu	Gly	Leu	Thr	Pro
				365					370					375
Leu	Ala	Thr	Leu	Lys	Asn	Asp	Gln	Gln	Arg	Arg	Gln	Leu	Gly	Lys
				380					385					390
Ser	His	Leu	Arg	Arg	Ala	Met	Ala	His	His	Glu	Glu	Ser	Val	Arg
				395					400					405
Glu	Ala	Ser	Leu	Cys	Lys	Lys	Leu	Arg	Thr	Ile	Glu	Val	Leu	Gln
				410					415					420
Lys	Val	Leu	Cys	Ala	Ala	Gln	Glu	Arg	Ser	Arg	Leu	Thr	Tyr	Ala
				425					430					435
Gln	His	Gln	Glu	Glu	Asp	Asp	Leu	Leu	Asn	Leu	Ile	Asp	Ala	Pro
				440					445					450
Ser	Val	Val	Ala	Lys	Thr	Glu	Gln	Glu	Val	Asp	Ile	Ile	Leu	Pro
				455					460					465
Gln	Phe	Ser	Lys	Leu	Thr	Val	Thr	Asp	Phe	Phe	Gln	Lys	Leu	Gly
				470					475					480
Pro	Leu	Ser	Val	Phe	Ser	Ala	Asn	Lys	Arg	Trp	Thr	Pro	Pro	Arg
				485					490					495
Ser	Ile	Arg	Phe	Thr	Ala	Glu	Glu	Gly	Asp	Leu	Gly	Phe	Thr	Leu
				500					505					510
Arg	Gly	Asn	Ala	Pro	Val	Gln	Val	His	Phe	Leu	Asp	Pro	Tyr	Cys
				515					520					525
Ser	Ala	Ser	Val	Ala	Gly	Ala	Arg	Glu	Gly	Asp	Tyr	Ile	Val	Ser
				530					535					540
Ile	Gln	Leu	Val	Asp	Cys	Lys	Trp	Leu	Thr	Leu	Ser	Glu	Val	Met
				545					550					555
Lys	Leu	Leu	Lys	Ser	Phe	Gly	Glu	Asp	Glu	Ile	Glu	Met	Lys	Val
				560					565					570
Val	Ser	Leu	Leu	Asp	Ser	Thr	Ser	Ser	Met	His	Asn	Lys	Ser	Ala
				575					580					585
Thr	Tyr	Ser	Val	Gly	Met	Gln	Lys	Thr	Tyr	Ser	Met	Ile	Cys	Leu
				590					595					600
Ala	Ile	Asp	Asp	Asp	Asp	Lys	Thr	Asp	Lys	Thr	Lys	Lys	Ile	Ser
				605					610					615
Lys	Lys	Leu	Ser	Phe	Leu	Ser	Trp	Gly	Thr	Asn	Lys	Asn	Arg	Gln
				620					625					630
Lys	Ser	Ala	Ser	Thr	Leu	Cys	Leu	Pro	Ser	Val	Gly	Ala	Ala	Arg
				635					640					645
Pro	Gln	Val	Lys	Lys	Lys	Leu	Pro	Ser	Pro	Phe	Ser	Leu	Leu	Asn
				650					655					660
Ser	Asp	Ser	Ser	Trp	Tyr									

665

<210> 62
 <211> 746
 <212> PRT
 <213> Homo sapiens

 <220>
 <221> misc_feature
 <223> Incyte ID No: 3576329CD1

<400> 62
 Met Ala Gly Ser Arg Gly Ala Gly Arg Thr Ala Ala Pro Ser Val
 1 5 10 15
 Arg Pro Glu Lys Arg Arg Ser Glu Pro Glu Leu Glu Pro Glu Pro
 20 25 30
 Glu Pro Glu Pro Pro Leu Leu Cys Thr Ser Pro Leu Ser His Ser
 35 40 45
 Thr Gly Ser Asp Ser Gly Val Ser Asp Ser Glu Glu Ser Val Phe
 50 55 60
 Ser Gly Leu Glu Asp Ser Gly Ser Asp Ser Ser Glu Asp Asp Asp
 65 70 75
 Glu Gly Asp Glu Glu Gly Glu Asp Gly Ala Leu Asp Asp Glu Gly
 80 85 90
 His Ser Gly Ile Lys Lys Thr Thr Glu Glu Gln Val Gln Ala Ser
 95 100 105
 Thr Pro Cys Pro Arg Thr Glu Met Ala Ser Ala Arg Ile Gly Asp
 110 115 120
 Glu Tyr Ala Glu Asp Ser Ser Asp Glu Glu Asp Ile Arg Asn Thr
 125 130 135
 Val Gly Asn Val Pro Leu Glu Trp Tyr Asp Asp Phe Pro His Val
 140 145 150
 Gly Tyr Asp Leu Asp Gly Arg Arg Ile Tyr Lys Pro Leu Arg Thr
 155 160 165
 Arg Asp Glu Leu Asp Gln Phe Leu Asp Lys Met Asp Asp Pro Asp
 170 175 180
 Tyr Trp Arg Thr Val Gln Asp Pro Met Thr Gly Arg Asp Leu Arg
 185 190 195
 Leu Thr Asp Glu Gln Val Ala Leu Val Arg Arg Leu Gln Ser Gly
 200 205 210
 Gln Phe Gly Asp Val Gly Phe Asn Pro Tyr Glu Pro Ala Val Asp
 215 220 225
 Phe Phe Ser Gly Asp Val Met Ile His Pro Val Thr Asn Arg Pro
 230 235 240
 Ala Asp Lys Arg Ser Phe Ile Pro Ser Leu Val Glu Lys Glu Lys
 245 250 255
 Val Ser Arg Met Val His Ala Ile Lys Met Gly Trp Ile Gln Pro
 260 265 270
 Arg Arg Pro Arg Asp Pro Thr Pro Ser Phe Tyr Asp Leu Trp Ala
 275 280 285
 Gln Glu Asp Pro Asn Ala Val Leu Gly Arg His Lys Met His Val
 290 295 300
 Pro Ala Pro Lys Leu Ala Leu Pro Gly His Ala Glu Ser Tyr Asn
 305 310 315
 Pro Pro Pro Glu Tyr Leu Leu Ser Glu Glu Glu Arg Leu Ala Trp
 320 325 330
 Glu Gln Gln Glu Pro Gly Glu Arg Lys Leu Gly Phe Leu Pro Arg
 335 340 345
 Lys Phe Pro Ser Leu Arg Ala Val Pro Ala Tyr Gly Arg Phe Ile
 350 355 360
 Gln Glu Arg Phe Glu Arg Cys Leu Asp Leu Tyr Leu Cys Pro Arg
 365 370 375
 Gln Arg Lys Met Arg Val Asn Val Asp Pro Glu Asp Leu Ile Pro
 380 385 390

Lys Leu Pro Arg Pro Arg Asp Leu Gln Pro Phe Pro Thr Cys Gln
 395 400 405
 Ala Leu Val Tyr Arg Gly His Ser Asp Leu Val Arg Cys Leu Ser
 410 415 420
 Val Ser Pro Gly Gly Gln Trp Leu Val Ser Gly Ser Asp Asp Gly
 425 430 435
 Ser Leu Arg Leu Trp Glu Val Ala Thr Ala Arg Cys Val Arg Thr
 440 445 450
 Val Pro Val Gly Gly Val Val Lys Ser Val Ala Trp Asn Pro Ser
 455 460 465
 Pro Ala Val Cys Leu Val Ala Ala Ala Val Glu Asp Ser Val Leu
 470 475 480
 Leu Leu Asn Pro Ala Leu Gly Asp Arg Leu Val Ala Gly Ser Thr
 485 490 495
 Asp Gln Leu Leu Ser Ala Phe Val Pro Pro Glu Glu Pro Pro Leu
 500 505 510
 Gln Pro Ala Arg Trp Leu Glu Ala Ser Glu Glu Arg Gln Val
 515 520 525
 Gly Leu Arg Leu Arg Ile Cys His Gly Lys Pro Val Thr Gln Val
 530 535 540
 Thr Trp His Gly Arg Gly Asp Tyr Leu Ala Val Val Leu Ala Thr
 545 550 555
 Gln Gly His Thr Gln Val Leu Ile His Gln Leu Ser Arg Arg Arg
 560 565 570
 Ser Gln Ser Pro Phe Arg Arg Ser His Gly Gln Val Gln Arg Val
 575 580 585
 Ala Phe His Pro Ala Arg Pro Phe Leu Leu Val Ala Ser Gln Arg
 590 595 600
 Ser Val Arg Leu Tyr His Leu Leu Arg Gln Glu Leu Thr Lys Lys
 605 610 615
 Leu Met Pro Asn Cys Lys Trp Val Ser Ser Leu Ala Val His Pro
 620 625 630
 Ala Gly Asp Asn Val Ile Cys Gly Ser Tyr Asp Ser Lys Leu Val
 635 640 645
 Trp Phe Asp Leu Asp Leu Ser Thr Lys Pro Tyr Arg Met Leu Arg
 650 655 660
 His His Lys Lys Ala Leu Arg Ala Val Ala Phe His Pro Arg Tyr
 665 670 675
 Pro Leu Phe Ala Ser Gly Ser Asp Asp Gly Ser Val Ile Val Cys
 680 685 690
 His Gly Met Val Tyr Asn Asp Leu Leu Gln Asn Pro Leu Leu Val
 695 700 705
 Pro Val Lys Val Leu Lys Gly His Val Leu Thr Arg Asp Leu Gly
 710 715 720
 Val Leu Asp Val Ile Phe His Pro Thr Gln Pro Trp Val Phe Ser
 725 730 735
 Ser Gly Ala Asp Gly Thr Val Arg Leu Phe Thr
 740 745

<210> 63

<211> 212

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3805550CD1

<400> 63

Met Ala Gly Pro Gly Pro Gly Pro Gly Asp Pro Asp Glu Gln Tyr
 1 5 10 15
 Asp Phe Leu Phe Lys Leu Val Leu Val Gly Asp Ala Ser Val Gly
 20 25 30
 Lys Thr Cys Val Val Gln Arg Phe Lys Thr Gly Ala Phe Ser Glu

	35		40		45									
Arg	Gln	Gly	Ser	Thr	Ile	Gly	Val	Asp	Phe	Thr	Met	Lys	Thr	Leu
	50								55					60
Glu	Ile	Gln	Gly	Lys	Arg	Val	Lys	Leu	Gln	Ile	Trp	Asp	Thr	Ala
	65								70					75
Gly	Gln	Glu	Arg	Phe	Arg	Thr	Ile	Thr	Gln	Ser	Tyr	Tyr	Arg	Ser
	80								85					90
Ala	Asn	Gly	Ala	Ile	Leu	Ala	Tyr	Asp	Ile	Thr	Lys	Arg	Ser	Ser
	95								100					105
Phe	Leu	Ser	Val	Pro	His	Trp	Ile	Glu	Asp	Val	Arg	Lys	Tyr	Ala
	110								115					120
Gly	Ser	Asn	Ile	Val	Gln	Leu	Leu	Ile	Gly	Asn	Lys	Ser	Asp	Leu
	125								130					135
Ser	Glu	Leu	Arg	Glu	Val	Ser	Leu	Ala	Glu	Ala	Gln	Ser	Leu	Ala
	140								145					150
Glu	His	Tyr	Asp	Ile	Leu	Cys	Ala	Ile	Glu	Thr	Ser	Ala	Lys	Asp
	155								160					165
Ser	Ser	Asn	Val	Glu	Glu	Ala	Phe	Leu	Arg	Val	Ala	Thr	Glu	Leu
	170								175					180
Ile	Met	Arg	His	Gly	Gly	Pro	Leu	Phe	Ser	Glu	Lys	Ser	Pro	Asp
	185								190					195
His	Ile	Gln	Leu	Asn	Ser	Lys	Asp	Ile	Gly	Glu	Gly	Trp	Gly	Cys
	200								205					210

Gly Cys

<210> 64

<211> 307

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 4546403CD1

<400> 64

Met	Arg	Cys	Leu	His	Ser	Glu	Lys	Ala	His	Asp	Leu	Gly	Ile	Thr
1				5					10					15
Cys	Cys	Asp	Phe	Ser	Ser	Gln	Pro	Val	Ser	Asp	Gly	Glu	Gln	Gly
				20					25					30
Leu	Gln	Phe	Phe	Arg	Leu	Ala	Ser	Cys	Gly	Gln	Asp	Cys	Gln	Val
				35					40					45
Lys	Ile	Trp	Ile	Val	Ser	Phe	Thr	His	Ile	Leu	Gly	Phe	Glu	Leu
				50					55					60
Lys	Tyr	Lys	Ser	Thr	Leu	Ser	Gly	His	Cys	Ala	Pro	Val	Leu	Ala
				65					70					75
Cys	Ala	Phe	Ser	His	Asp	Gly	Gln	Met	Leu	Val	Ser	Gly	Ser	Val
				80					85					90
Asp	Lys	Ser	Val	Ile	Val	Tyr	Asp	Thr	Asn	Thr	Glu	Asn	Ile	Leu
				95					100					105
His	Thr	Leu	Thr	Gln	His	Thr	Arg	Tyr	Val	Thr	Thr	Cys	Ala	Phe
				110					115					120
Ala	Pro	Asn	Thr	Leu	Leu	Ala	Thr	Gly	Ser	Met	Asp	Lys	Thr	
				125					130					135
Val	Asn	Ile	Trp	Gln	Phe	Asp	Leu	Glu	Thr	Leu	Cys	Gln	Ala	Arg
				140					145					150
Ser	Thr	Glu	His	Gln	Leu	Lys	Gln	Phe	Thr	Glu	Asp	Trp	Ser	Glu
				155					160					165
Glu	Asp	Val	Ser	Thr	Trp	Leu	Cys	Ala	Gln	Asp	Leu	Lys	Asp	Leu
				170					175					180
Val	Gly	Ile	Phe	Lys	Met	Asn	Asn	Ile	Asp	Gly	Lys	Glu	Leu	Leu
				185					190					195
Asn	Leu	Thr	Lys	Glu	Ser	Leu	Ala	Asp	Asp	Leu	Lys	Ile	Glu	Ser
				200					205					210

Leu Gly Leu Arg	Ser Lys Val Leu Arg	Lys Ile Glu Glu Leu Arg
	215	220
Thr Lys Val Lys	Ser Leu Ser Ser Gly	Ile Pro Asp Glu Phe Ile
	230	235
Cys Pro Ile Thr	Arg Glu Leu Met Lys	Asp Pro Val Ile Ala Ser
	245	250
Asp Gly Tyr Ser	Tyr Glu Lys Glu Ala	Met Glu Asn Trp Ile Ser
	260	265
Lys Lys Lys Arg	Thr Ser Pro Met Thr	Asn Leu Val Leu Pro Ser
	275	280
Ala Val Leu Thr	Pro Asn Arg Thr Leu	Lys Met Ala Ile Asn Arg
	290	295
Trp Leu Glu Thr	His Gln Lys	
	305	

<210> 65

<211> 378

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 4767318CD1

<400> 65

Met Arg Ala Ala	Ala Ala Pro Gly Leu Thr	Ala Pro Trp Arg Leu
1	5	10
Leu Gln Cys Cys	Glu Leu Glu Ala Gly	Glu Leu Gly Met Ala Val
	20	25
Pro Ala Ala Ala	Met Gly Pro Ser Ala	Leu Gly Gln Ser Gly Pro
	35	40
Gly Ser Met Ala	Pro Trp Cys Ser Val	Ser Ser Gly Pro Ser Arg
	50	55
Tyr Val Leu Gly	Met Gln Glu Leu Phe	Arg Gly His Ser Lys Thr
	65	70
Arg Glu Phe Leu	Ala His Ser Ala Lys	Val His Ser Val Ala Trp
	80	85
Ser Cys Asp Gly	Arg Arg Leu Ala Ser	Gly Ser Phe Asp Lys Thr
	95	100
Ala Ser Val Phe	Leu Leu Glu Lys Asp	Arg Leu Val Lys Glu Asn
	110	115
Asn Tyr Arg Gly	His Gly Asp Ser Val	Asp Gln Leu Cys Trp His
	125	130
Pro Ser Asn Pro	Asp Leu Phe Val Thr	Ala Ser Gly Asp Lys Thr
	140	145
Ile Arg Ile Trp	Asp Val Arg Thr Thr	Lys Cys Ile Ala Thr Val
	155	160
Asn Thr Lys Gly	Glu Asn Ile Asn Ile	Cys Trp Ser Pro Asp Gly
	170	175
Gln Thr Ile Ala	Val Gly Asn Lys Asp	Asp Val Val Thr Phe Ile
	185	190
Asp Ala Lys Thr	His Arg Ser Lys Ala	Glu Glu Gln Phe Lys Phe
	200	205
Glu Val Asn Glu	Ile Ser Trp Asn Asn	Asp Asn Asn Met Phe Phe
	215	220
Leu Thr Asn Gly	Asn Gly Cys Ile Asn	Ile Leu Ser Tyr Pro Glu
	230	235
Leu Lys Pro Val	Gln Ser Ile Asn Ala	His Pro Ser Asn Cys Ile
	245	250
Cys Ile Lys Phe	Asp Pro Met Gly Lys	Tyr Phe Ala Thr Gly Ser
	260	265
Ala Asp Ala Leu	Val Ser Leu Trp Asp	Val Asp Glu Leu Val Cys
	275	280
Val Arg Cys Phe	Ser Arg Leu Asp Trp	Pro Val Arg Thr Leu Ser

	290		295		300
Phe Ser His Asp Gly Lys Met Leu Ala Ser Ala Ser Glu Asp His					
	305		310		315
Phe Ile Asp Ile Ala Glu Val Glu Thr Gly Asp Lys Leu Trp Glu					
	320		325		330
Val Gln Cys Glu Ser Pro Thr Phe Thr Val Ala Trp His Pro Lys					
	335		340		345
Arg Pro Leu Leu Ala Phe Ala Cys Asp Asp Lys Asp Gly Lys Tyr					
	350		355		360
Asp Ser Ser Arg Glu Ala Gly Thr Val Lys Leu Phe Gly Leu Pro					
	365		370		375
Asn Asp Ser					

<210> 66

<211> 466

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 4834527CD1

<400> 66

Met Pro Gln Thr Leu Ser Ala Ser Asp Met Val Thr Pro Gly Ser					
1	5		10		15
Leu Ser Pro Pro Pro Thr Glu Pro Thr Asp Gly Glu Gln Ala Gly					
	20		25		30
Gln Pro Leu Leu Asp Gly Ala Pro Ser Ser Ala Ser Leu Glu Thr					
	35		40		45
Leu Ile Gln His Leu Val Pro Thr Ala Asp Tyr Tyr Pro Glu Lys					
	50		55		60
Ala Tyr Ile Phe Thr Phe Leu Leu Ser Ser Arg Leu Phe Ile Glu					
	65		70		75
Pro Arg Glu Leu Leu Ala Arg Val Cys His Leu Cys Ile Glu Gln					
	80		85		90
Gln Gln Leu Asp Lys Pro Val Leu Asp Lys Ala Arg Val Arg Lys					
	95		100		105
Phe Gly Pro Lys Leu Leu Gln Leu Leu Ala Glu Trp Thr Glu Thr					
	110		115		120
Phe Pro Arg Asp Phe Gln Glu Glu Ser Thr Ile Gly His Leu Lys					
	125		130		135
Asp Val Val Gly Arg Ile Ala Pro Cys Asp Glu Ala Tyr Arg Lys					
	140		145		150
Arg Met His Gln Leu Leu Gln Ala Leu His Gln Lys Leu Ala Ala					
	155		160		165
Leu Arg Gln Gly Pro Glu Gly Leu Val Gly Ala Asp Lys Pro Ile					
	170		175		180
Ser Tyr Arg Thr Lys Pro Pro Ala Ser Ile His Arg Glu Leu Leu					
	185		190		195
Gly Val Cys Ser Asp Pro Tyr Thr Leu Ala Gln Gln Leu Thr His					
	200		205		210
Val Glu Leu Glu Arg Leu Arg His Ile Gly Pro Glu Glu Phe Val					
	215		220		225
Gln Ala Phe Val Asn Lys Asp Pro Leu Ala Ser Thr Lys Pro Cys					
	230		235		240
Phe Ser Asp Lys Thr Ser Asn Leu Glu Ala Tyr Val Lys Trp Phe					
	245		250		255
Asn Arg Leu Cys Tyr Leu Val Ala Thr Glu Ile Cys Met Pro Ala					
	260		265		270
Lys Lys Lys Gln Arg Ala Gln Val Ile Glu Phe Phe Ile Asp Val					
	275		280		285
Ala Arg Glu Cys Phe Asn Ile Gly Asn Phe Asn Ser Leu Met Ala					
	290		295		300

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Ile Ile Ser Gly Met Asn Met Ser Pro Val Ser Arg Leu Lys Lys
                305                310                315
Thr Trp Ala Lys Val Arg Thr Ala Lys Phe Phe Ile Leu Glu His
                320                325                330
Gln Met Asp Pro Thr Gly Asn Phe Cys Asn Tyr Arg Thr Ala Leu
                335                340                345
Arg Gly Ala Ala His Arg Ser Leu Thr Ala His Ser Ser Arg Glu
                350                355                360
Lys Ile Val Ile Pro Phe Phe Ser Leu Leu Ile Lys Asp Ile Tyr
                365                370                375
Phe Leu Asn Glu Gly Cys Ala Asn Arg Leu Pro Asn Gly His Val
                380                385                390
Asn Phe Glu Lys Phe Leu Glu Leu Ala Lys Gln Val Gly Glu Phe
                395                400                405
Ile Thr Trp Lys Gln Val Glu Cys Pro Phe Glu Gln Asp Ala Ser
                410                415                420
Ile Thr His Tyr Leu Tyr Thr Ala Pro Ile Phe Ser Glu Asp Gly
                425                430                435
Leu Tyr Leu Ala Ser Tyr Glu Ser Glu Ser Pro Glu Asn Gln Thr
                440                445                450
Glu Lys Glu Arg Trp Lys Ala Leu Arg Ser Ser Ile Leu Gly Lys
                455                460                465
Thr

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<210> 67
 <211> 891
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Incyte ID No: 1405545CB1

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<400> 67
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gctagagcga ctgagccgct ataatagcac gtcccaagct tttgctgagg tgctgcggt 120
gccgaagcag cagctgagga agctgctgta cccgctgcag gaagtagagc ggttcctcgc 180
cccctacggg aggcaagacc ttcaacctgc tatctttgac ccaagcccg aggacatagc 240
cagggcggaac aacatcttca cggccactga acggaaccgc atcgactacg tcagctccgc 300
cgcccgatc gaccacgccc cggaccttcc gcggccagag gtgtgtttta taggcagaag 360
caatgttga aaatcatctc taatcaaggc tttattttca ctggcccctg aggttgaggt 420
cagagtctcc aaaaaaccag gacacacaaa gaaaatgaat tttttcaaag ttggaaaaca 480
ttttacagt gtggacatgc caggttatgg ctttagagca cctgaagatt ttgttgacat 540
ggtagagacc tatctaaaag aacgaaggaa cttgaagaga acatttttat tagtgatag 600
cgtgttga attcaaaaaa cagacaatat tgccatagaa atgtgtgaag aatttgcat 660
accttatgt attgtattaa caaaaattga caaatcttcc aaggacatc ttttaaaaca 720
agtgttcag atccagaaat ttgttaacat gaaaactcaa ggatgttttc ctcagttgtt 780
tcctgtaagt gctgtgacct tttctggaat ccacctgttg agatgcttta tagccagtgt 840
aacaggaagt cttgactaat ggttcccgtt ttagctgaag attcaaaaaa a 891

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<210> 68
 <211> 1512
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Incyte ID No: 1451265CB1

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<400> 68
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ggaacttcac tcgggcgcca acctgtcac ctaccgcggc ggccaggcgg gaccccgcg 120
cctggcgctg ctcaatggcg agtatctgct ggcgggcgag ctgggcaaga attacatcag 180

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cgcttgggag ctccagcgga aggaccagct ccagcagaag atcatgtgcc ccgggcctgt 240
cacctgtctg actgcatcac ccaatggtct ctacgtcctg gcaggagtgt cagaaagcat 300
ccacctgtgg gaggtctcca ccgggaacct tctggtcatc ctgagtcgac actaccagga 360
cgtctcctgc cttcagttca caggggacag cagccacttc atctcagggg gcaaggactg 420
cctgggtgctg gtttgagacc tctgcagcgt gctgcaggcc gacccctcca ggattccggc 480
gcccaggcac gtctggtctc accacacgct ccccatcacg gacctgcact gcggctttgg 540
gggccccctg gcccgggtgg ccacctcctc actggaccag acggtgaagc tatgggaggt 600
ctcctcgggg gagctgctgc tctccgtcct ctttgacgtg tccatcatgg cagtgaacct 660
ggacctggct gagcaccata tgttctgctg gggcagttag ggctccatct tccaggtcga 720
cctcttcacc tggcccggac agagggagag gagcttccac ccagagcagg acgccgggaa 780
ggtcttcaaa gggcacagga accaggtgac ttgctgtgca gtgtccactg acggcagcgt 840
gctgctctca ggctcccacg acgagaccgt gcgcctctgg gacgtgcaga gcaagcagt 900
catccggacg gtggccctca aaggccagc caccaatgcc gccatcctgc tggcgccgt 960
cagcatgctg agctcagact tcaggccag cctgccgtg cccacttca acaagacct 1020
gctgggcgcc gagcacgggg acgagccgag ccacgggggc ctactctgc gcctgggct 1080
ccaccagcag ggctcggagc ccagctacct ggaccgcagc gagcagctgc agccgctct 1140
gtgcagcacc atggagaaga gcgtgctcgg ggcacaggac cagctgcgag tccgtgtgac 1200
ggagctggag gacgaggtgc gcaacctgcg caagatcaat cgggacctgt tcgacttctc 1260
cacgcgcttc atcacgcggc cggccaagt aggcccgag accccggccc gaggcgcca 1320
ggcctgagcc ccatgcctcc cagcaaccag ggcccggcg tgtggccccc accagcccag 1380
gcctggactc tccctagttc tgtgtcgtgt tcgggtttt cctctgtgac tgggcccgtc 1440
tggtgtctcg tccacgcgt cacagtgggt ctagtctgtt ttaacaaaa gaggatgaaa 1500
aaaaaaaaaa aa 1512

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<210> 69

<211> 2536

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1556311CB1

<400> 69

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tcttgtctct cgcgacaatt ctctttgaag gcgaggcatt tcaccacaac tcttttcaac 180
caacctggcg acaacaccca gagcttacat tgaccccaat ttgaattttc atcgcccaa 240
ggctttcttt acactcaggg aactctcaca ctcttaggg ggaaaaaggc ttcgttaagg 300
gccttgcaag ggttaccggg ttccggaatt ttcccgggg cccctcggct ggccaggact 360
gaaacccaga cgagcatgcc agaaacagtc aaccataaca aacatgggaa cgtagctctc 420
cctggaacga aaccaactcc catccctcca ccccggtga agaagcaggc tctttttctg 480
gaagcagagg gcggtgcaaa gaccttgagc ggcggccggc cgggcgcagg cccggagctg 540
gagctgggca cagctggcag ccaggtggg gcccgcctg aggccgccc gggggattgc 600
acaaggggcc cgccgcccag ctctgaatca cggcccccgt gccatggagg ccggcagcgg 660
ctgagcgaca tgagcatctc tacttctctc tccgactcgc tggagtcca ccggagcatg 720
cctctgtttg gctacgaggc ggacaccaac agcagcctgg aggactacga gggggaaagt 780
gaccaagaga ccatggcgcc ccccatcaag tccaaaaaga aaaggagcag ctcttctctg 840
ctgcccagc tcgtcaagtc ccagctgcag aagggtgagc ggggtgttcag ctcttctcat 900
accccgagga agcggatggt ccgcaggatc gccgagcttt cccgggacaa atgcacctac 960
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tccagcaccc acatgctgca gacctccgg cagttcatga ccaggtcaa gaactatttg 1080
tctcagagct cggagctgga ccccccatc gagtcgctga tccctgaaga ccaaatagat 1140
gtggtgctgg aaaaagccat gcacaagtgc atcttgaagc ccctcaagg gcacgtggag 1200
gccatgctga aggactttca catggccgat ggctcatgga agcaactcaa ggagaacctg 1260
cagcttgtgc ggcagaggaa tccgcaggag ctgggggtct tcgcccggac ccctgatttt 1320
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aagaaggtea tgctgctgct gcgggtctgc aagctcattt acacggtcat ggagaacaac 1440
tcaggaggag tgtatggcgc tgatgacttc ttgccagtc tgacctatgt catagcccag 1500
tgtgtacatg ttgaattgga cactgaaatc gagtacatga tggagctcct agaccatctg 1560
ctgttacatg gagaaggagg ctattacttg acaagcgcat atggagcact ttctctgata 1620
aagaatttcc aagaagaaca agcagcgca ctgctcagct cagaaaccag agacaccctg 1680
aggcagtggc acaaacggag aaccaccaac cggaccatcc cctctgtgga cgacttccag 1740

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aattacctcc gagttgcatt tcaggaggtc aacagtgggt gcacaggaaa gacctcctt 1800
gtgagacctt acatcaccac tgaggatgtg tgtcagatct gcgctgagaa gttcaagggtg 1860
ggggaccctg aggagtacag cctctttctc ttcgttgacg agacatggca gcagctggca 1920
gaggacactt accctcaaaa aatcaaggcg gagctgcaca gccgaccaca gccccacatc 1980
ttccactttg tctacaaacg catcaagaac gatccttatg gcatcatttt ccagaacggg 2040
gaagaagacc tcaccacctc ctagaagaca ggcgggactt ccagatgggt catccaaagg 2100
ggagctggaa gccttgctt cccgcttcta catgcttgag cttgaaaagc agtcacctcc 2160
tcggggaccc ctcatgttag tgactaagcc atccacaggc caactcggcc aagggcaact 2220
ttagccacgc aaggtagctg aggtttgtga aacagttaga ttctcttttg gcaatggaga 2280
attgcatctg atgggttcaag tgccttgaga ttgtttgcta cctaccccca gtcaggttct 2340
aggttggtct acaggtatgt atatgtgcag aagaaacact taagatacaa gttcttttga 2400
attcaacagc agatgcttgc gatgcagtgc gtcaggtgat tctcactcct gtggatggct 2460
tcacccctgc ctcccttctc ttctttttcc ttgtgtgtgt tttttttttt ttttaaaaaa 2520
gccttcgggt tttaaa 2536

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<210> 70

<211> 1415

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1901373CB1

<400> 70

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gcgaggacgc gggccgagcc ggaagtggag tgcgctgcgg cgcgagctgg gccggcgggc 60
gtggttcgag agcgcgcaga gtccagactg gcggcagggc ccgagggggc gacccgcagc 120
gtccctgggtc tctccagccc tccactcgaa ccgcaactgac aataccctcc cctcccttgg 180
gctggacccc tctctacagc taggagccaa tggcagaaga caaaaccaa ccgagtggag 240
tggaccaagg gaagtatgat gctgatgaca acgtgaagat catctgcctg ggagacagcg 300
cagtgaggaa atccaaactc atggagagat ttctcatgga tggctttcag ccacagcagc 360
tgtccacgta cgccttgacc ctgtacaagc acacagccac ggtagatgga aggaccatcc 420
ttgtggactt ttgggacacg gcaggccagg agcgggtcca gagcatgcat gcctcctact 480
accacaaggc ccagcctgc atcatggtgt ttgatgtaca gaggaaagtc acctatagga 540
acctgagcac ctgggtataca gagcttcggg agttcaggcc agagatccca tgcctcgtgg 600
tggccaataa aattgatgca gacataaacg tgacccaaaa aagcttcaat ttgccaaga 660
agttctccct gccctgtat ttctgtcggc ctgctgatgg taccaatggt gtgaagctct 720
tcaatgatgc aattcgatta gctgtgtctt acaaacagaa ctcccaggac ttcattggatg 780
agatttttca ggagctcgag aacttcagct tggagcagga agaggaggac gtgccagacc 840
aggaacagag cagcagcatc gagaccccat cagaggaggt ggcctctccc cacagctgag 900
gggctggggc taggggtggg tggagccctt ttaaaatacc cttcccttca acaactctcc 960
agctctgaat ggagaaactc tctaggccat cccctcttct acctcctgca acccaccat 1020
cctattagcc tcccacattc aaggcccggt atacagggat gaggtcagca ccagcaact 1080
ctggactggg ggaagaattc cccaccagat ctcttgaag cagaattagg gatcagcatc 1140
attaacacct tccccacccc ctcccgcag cgagacagtg aagagaatca gaaaacatga 1200
ttatgtgtca ctttaataca ggaaatttag gtgttttttg gtgtttttgt ttttgttttt 1260
gttttcttcc caaagctcac ctcggggaca attccttggg cttctcctga ggtaattgatt 1320
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cttttttctc cttcagcttc ccagtcactt ggttt 1415

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<210> 71

<211> 1902

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2367767CB1

<400> 71

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gcgaggtctg gctaggctac gggccacgag ccgcccgcgc tgcgcccgc actgtcctct 60
tcggaggcgc gggcccgacg gaaacctatg ttgtggctcg cagcatcgcg gcggaccaca 120
aggatctcat ccacgatgtc tctttcgact tccacgggag cgggatggca acctgctcca 180

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gcatcagag cgttaagggtc tgggataaaa gtgaaagtgg tgattggcat tgtactgcta 240
gctggaagac acatagtggg tctgtatggc gtgtgacatg ggcccatcct gaatttgggc 300
agggttttggc ttcctgttct tttgaccgaa cagctgctgt atgggaagaa atagttaggag 360
aatcaaatga taaactgcga ggacagagcc actgggttaa aaggacaact ctgggtggata 420
gcagaacatc tgttactgat gtgaagtttg ctcccaagca catgggtctt atgttagcaa 480
cctgttccgc agatggtata gtaagaatct atgaggcacc agatgttatg aatctcagcc 540
agtgggtcttt gcagcatgag atctcatgta agctaagctg tagttgtatt tcttggaaac 600
cttcaagctc tctgtctcat tcccccatga tcgccgtagg aagtgatgac agtagcccca 660
acgcaatggc caaggttcag atttttgaat ataataaaaa caccaggaaa tatgcaaaag 720
ctgaaactct tatgacagtc actgatcctg ttcattgatat tgcattcgct ccaaatttgg 780
gaagatcttt ccatattcta gcaatagcga ccaaagatgt gagaattttt acattaaagc 840
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tttgaaatat aaacggagag gctttctgtt gagacattgt caccaaaaca attttttgaa 1440
atgttctctga aactaatltg ggtttaaaga ttaaaagggt tgttaccatt cttatctgag 1500
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gctttcttaa aacagcttaa aatgatgaac ttttataatt ttaatttgaa gattgaataa 1620
atatttttta taaagattgt tttgagtgtc gatttgttta cttttttag agttgtttaa 1680
tccatgatat tcagtacaac tctgtcattt ctttgtaata tttaaaaaat attagtaaag 1740
gagtgaatta ataaagtagt aatagtaaaa tgaaaggaac ttgactgtac agtttgtagc 1800
caggttaagc atttggtatt gtttcattta caatttggga ctaagatgga aacacttttt 1860
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<210> 72

<211> 1681

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3090433CB1

<400> 72

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tcaccaagtg tcatctaccg gccacacctt tcagctttat cctctgtacc tatccaggca 180
aatgcattag atgtttctga acttcctaca caaccctgtg attcatcccc cagacgttta 240
aattgtgagg aaatatctag tatcagcttt catgttacag acccagcccc ttgctctacc 300
tctggagtca cagctggatt aactaaatta actacaagaa aggacaacta taatgcagag 360
agagagtttt tacaggggtc tactataaca gaggcttgcg atggcagtga tgatattttt 420
gggttgagta ctgatagtct gtctcgttta cgaagcccat ctgttttggg agttagagaa 480
aagggctatg aacgattaaa agaagaactc gcaaaagctc agaggggaact gaagttaaaa 540
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<210> 73
 <211> 1378
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Incyte ID No: 3800591CB1

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<400> 73
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<210> 74
 <211> 1444
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Incyte ID No: 5308471CB1

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<400> 74
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<210> 75

<211> 2067

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 5324322CB1

<400> 75

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ggctttttta ccaaaaaaaaa aaaaaaa 2067
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<210> 76

<211> 2085

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 067184CB1

<400> 76

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agtttacatc gggcgcttagc caccttgacg gaggagacta ctgtgtctct gaatactgtg 180
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ccatcttttt tttttttttt gagatggagt tttgcttgtt gccaggctg gagtgcagcg 2040
gcacgatctt ggttcactgc aacctccgcc tcccagggtc aagcg 2085

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<210> 77

<211> 2061

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 722896CB1

<400> 77

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<210> 78

<211> 981

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1571739CB1

<400> 78

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<210> 79

<211> 1375

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1739479CB1

<400> 79

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<210> 80

<211> 2833

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 1999147CB1

<400> 80

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cgtaccggct ctcgggctct tccgggtctc ggccgcccct tacctgcagg ctcttctccc 180
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<223> Incyte ID No: 2786701CB1
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<210> 88
<211> 1549
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<223> Incyte ID No: 3068538CB1

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<210> 89
<211> 1722
<212> DNA
<213> Homo sapiens

<220>
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<223> Incyte ID No: 5159072CB1

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<210> 90

<211> 1264

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 5519057CB1

<400> 90

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<210> 91

<211> 2640

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID.No: 035379CB1

<400> 91

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<210> 92

<211> 2071

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 275354CB1

<400> 92

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<210> 93

<211> 2149

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 311658CB1

<400> 93

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<210> 94

<211> 2332

<212> DNA

<213> Homo sapiens

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<221> misc_feature

<223> Incyte ID No: 1251632CB1

<400> 94

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<212> DNA

<213> Homo sapiens

<220>

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<223> Incyte ID No: 1331955CB1

<400> 95

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<211> 3260

<212> DNA

<213> Homo sapiens

<220>

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<220>
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<210> 100

<211> 1311

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2590967CB1

<400> 100

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<210> 101

<211> 2839

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2824491CB1

<400> 101

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<210> 102

<211> 1676

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2825460CB1

<400> 102

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<210> 103

<211> 3206

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2871116CB1

<400> 103

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<210> 104

<211> 921

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2942212CB1

<400> 104

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<210> 105

<211> 1367

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3685151CB1

<400> 105

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<210> 106

<211> 1560

<212> DNA

<213> Homo sapiens

<220>

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<223> Incyte ID No: 4881515CB1

<400> 106

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<223> Incyte ID No: 5324681CB1

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<211> 710

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 5782457CB1

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<212> DNA
<213> Homo sapiens

<220>
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<211> 3453

<212> DNA

<213> Homo sapiens

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<213> Homo sapiens

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<223> Incyte ID No: 1976780CB1

<400> 114

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 <213> Homo sapiens

<220>
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 <223> Incyte ID No: 2048234CB1

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 <212> DNA
 <213> Homo sapiens

<220>
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 <223> Incyte ID No: 2111754CB1

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<210> 117

<211> 3057

<212> DNA

<213> Homo sapiens

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<221> misc_feature

<223> Incyte ID No: 2123286CB1

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<212> DNA
<213> Homo sapiens

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<213> Homo sapiens

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<223> Incyte ID No: 2759119CB1

<220>
 <221> unsure
 <222> 4373, 4379
 <223> a, t, c, g, or other

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<210> 120

<211> 959

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2823818CB1

<400> 120

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<210> 121

<211> 1809

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2859730CB1

<400> 121

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<210> 122

<211> 2028

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 2861155CB1

<220>

<221> unsure

<222> 1943, 2003

<223> a, t, c, g, or other

<400> 122

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<210> 123

<211> 2223

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3002667CB1

<400> 123

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<210> 124

<211> 728

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3043734CB1

<400> 124

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<210> 125

<211> 2161

<212> DNA

<213> Homo sapiens

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<221> misc_feature

<223> Incyte ID No: 3294893CB1

<400> 125

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<210> 126

<211> 2782

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 3349052CB1

<400> 126

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taattggaag gcctgccgat ggtcttcctc aggggtgatt cctaataaaa aaatacagaa 240
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<210> 127
 <211> 3019
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Incyte ID No: 3357264CB1

<220>
 <221> unsure
 <222> 985
 <223> a, t, c, g, or other

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<400> 127
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cgacatccca tcctagcccc gcgatgtgcg gggctgtaat ccccttgcac aaaccggccg 180
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caaggtagat aatatactgt ttgatactca aaacattttt cattttgttt aaagtagaag 2880

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ttacataatt ctatatattta agtcttgggt aaaaaagtag ttttacattt tataaagtaa 2940
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tccagactgc gaaaagcga                                     3019

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<210> 128
<211> 2312
<212> DNA
<213> Homo sapiens

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<220>
<221> misc_feature
<223> Incyte ID No: 3576329CB1

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<400> 128
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```

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<210> 129
<211> 921
<212> DNA
<213> Homo sapiens

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<220>
<221> misc_feature
<223> Incyte ID No: 3805550CB1

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<400> 129
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ggcccaggcc cgggggaccc ggacgagcag tacgatttcc tgttcaagct ggtgctggtg 180
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<210> 130
<211> 1291
<212> DNA
<213> Homo sapiens

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<220>
<221> misc_feature
<223> Incyte ID No: 4546403CB1

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<400> 130
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tgtctgcata ttgaaaaaagc acatgatctt ggaattacct gctgcgattt ttcttcacag 180
ccagtttctg atggagaaca aggtcttcag ttttttcgac tggcatcatg tggtcaggat 240
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<210> 131
<211> 1836
<212> DNA
<213> Homo sapiens

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<220>
<221> misc_feature
<223> Incyte ID No: 4767318CB1

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<400> 131
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catatttggga gttaaaagaa ccaaataatta ctaagtaagc agacgcgggc acgcgctgca 180
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gctcttccgg gcgcatgctg gcggcagcgg cgcaggaact gactgcgccg tggaggctgc 300
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<210> 132

<211> 2136

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Incyte ID No: 4834527CB1

<400> 132

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